

# MEDICAL.

## REPORT OF THE PRINCIPAL CIVIL MEDICAL OFFICER AND INSPECTOR-GENERAL OF HOSPITALS FOR THE YEAR 1922.

I HAVE the honour to submit the following report on the health and sanitation of Ceylon and on the administration of the institutions of the Ceylon Civil Medical Department for the year ending December 31, 1922.

### SECTION I.—POPULATION.

2. The estimated population of Ceylon, inclusive of immigrant coolies, was 4,621,132 (of these, 9,100 were Europeans). This total population is an increase of 123,446 over the figures of the previous year.

### SECTION II.—PUBLIC HEALTH.

3. *Vital Statistics*.—179,858 births were registered, which is equivalent to an annual rate of 38·5 per 1,000 of the population, as compared with 183,920 births and an annual rate of 40·5 in 1921.

The deaths registered in 1922 amounted to 126,837 as compared with 140,749 in 1921, which is equivalent to an annual rate of 27·4 per 1,000 as compared with an annual rate of 31·0 in 1921.

In England and Wales during 1921 the birth-rate was 22·4 per 1,000 and the death-rate 12·1 per 1,000.

4. With regard to the causation of deaths, the following table shows the same, registered under the several classes of disease :—

I.—General diseases—			VI.—Non-venereal diseases of genito- urinary system and annexa. ..		
(a) Epidemic diseases ..	7,951				1,357
(b) Septic diseases ..	144		VII.—The puerperal state ..		3,650
(c) Tuberculosis diseases ..	3,417		VIII.—Diseases of the skin and cellular tissues ..		10,517
(d) Venereal diseases ..	255		IX.—Diseases of bones and organs of locomotion ..		24
(e) Cancer or malignant diseases ..	461		X.—Malformations ..		25
(f) Other general diseases ..	10,945		XI.—Diseases of early infancy ..		7,459
II.—Diseases of the nervous system and organs of special sense ..	16,059		XII.—Old age ..		4,603
III.—Diseases of the circulatory system ..	1,006		XIII.—Affections produced by external causes ..		2,466
IV.—Diseases of the respiratory system ..	12,215		XIV.—Ill-defined diseases ..		25,508
V.—Diseases of the digestive system ..	18,775				

5. The more notable causes of death were the following diseases :—

1. Infantile convulsions ..	13,812	10. Anchylostomiasis and its <i>sequelæ</i> ..	1,869
2. Diarrhoea ..	9,700	11. Malaria ..	1,621
3. Pneumonia ..	7,486	12. Puerperal septicæmia ..	1,540
4. Rickets ..	5,119	13. Enteric fever ..	542
5. Intestinal parasites ..	3,744	14. Tetanus ..	247
6. Anæmia ..	3,673	15. Rabies ..	25
7. Phthisis ..	3,108	16. Deaths attributed to pyrexia of unknown origin ..	20,171
8. Dropsy ..	2,955		
9. Dysentery ..	2,515		

The above list is based on the given causes of deaths, but it must be remembered that only a small proportion were certified to by a qualified medical man, and hence the figures, although serving as a comparison with previous years, cannot be looked upon as at all reliable as regards the true causes of death. The large number of deaths attributed to pyrexia of unknown origin, for example, is a proof of the lack of satisfactory registration of the actual causes of death.

6. *Infantile Mortality*.—The infantile mortality, *i.e.*, the deaths of children under 1 year of age per 1,000 births during the year is looked upon by sanitarians as affording the most important index as to the general sanitary conditions, and the continued high rate in Ceylon is a proof of the slow progress made in sanitary improvement in the Island generally. In the 33 principal towns the infantile mortality during the year was at the rate of 240 per 1,000 births, as compared with 259 in 1919, 228 in 1920, and 238 in 1921. In England and Wales in 1921 the rate was 83 per 1,000 births, and in 96 of the great towns in England was 87 per 1,000 births.

Some efforts to effect an improvement in this condition was made by increasing the facilities for training midwives (52 were trained at the Lying-in Home, Colombo, in 1922) and appointing more of them to Government institutions and encouraging their employment on estate hospitals. A crèche





was started in Colombo by the efforts of certain ladies, and an ante-natal clinic was started at the Lying-in Home to give advice to expectant mothers. Real progress in the reduction of infantile mortality depends mainly on the possibility of education creating a belief in modern hygienic principles amongst the mass of the population. It is said by local medical men that there is an increasing tendency to a reduction in the breast feeding of infants amongst the indigenous population, and this is to be deplored.

7. *Vital Statistics on Estates.*—The principal causes of death on estates were given as under :—

	1921.	1922.		1921.	1922.
1. Debility	3,475	2,946	6. Dysentery	1,666	852
2. Pneumonia	1,728	2,315	7. Phthisis	271	253
3. Infantile convulsions	1,256	1,207	8. Dropsy	241	125
4. Anchylostomiasis	1,889	1,095	9. Other diseases	6,038	5,071
5. Diarrhoea	1,462	860			

The number of deaths on estates is given by the Registrar-General as 14,764 and the number of births as 24,527, the actual birth-rate and death-rate is not given because of the uncertainty of the population of the estates in 1922.

8. *Influenza.*—In comparatively mild form occurred as localized outbreaks in many parts of the Island at different periods of the year.

9. *Malaria* showed an increase, as regards hospital admissions, over the large numbers of the previous year, there being no less than 29,424 cases admitted, as against 27,453 in 1921 and 16,538 in 1920. The Registrar-General reports 1,621 deaths from the disease in 1922, as against 1,502 in 1921 and 1,107 in 1920, but as regards deaths from pyrexia of unknown origin, of which a large number are undoubtedly due to malaria, the Registrar-General's figures are 20,171 in 1922, as against 21,381 in 1921.

From the table given below the comparative prevalence in different years in the different Provinces so far as can be judged from hospital admissions, can be seen :—

*Hospital Admissions : Malaria.*

	1920.		1921.		1922.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
General Hospital, Colombo	767	11	1,125	20	2,121	37
Western Province	2,807	35	4,036	71	6,640	74
Central Province	2,055	26	5,077	97	3,893	54
Northern Province	2,526	24	2,369	31	1,978	15
Eastern Province	563	1	856	5	755	4
Southern Province	1,038	18	1,504	30	1,476	26
North-Western Province	1,754	33	5,014	74	3,015	98
North-Central Province	1,834	40	2,432	46	2,072	42
Province of Uva	2,002	35	2,579	31	2,856	50
Province of Sabaragamuwa	1,192	22	2,461	52	3,456	63
Railway Extension hospitals	—	—	—	—	1,115	6
Total	16,538	245	27,453	457	29,377	475

The number of cases treated at Government dispensaries and hospital out-patient departments in 1922 was 956,810, as against 888,699 in 1921, and 488,872 in 1920. It will be noted that the most marked increase in hospital admissions is to be found in the figures given for the Western Province (and the General Hospital, Colombo), and that there is a considerable increase in the figures for the Province of Sabaragamuwa.

A report submitted by Mr. H. F. Carter, the Malariologist, is attached. The year's work in his Department has lead to a much better knowledge of the different factors affecting the prevalence and distribution of the disease in different parts of the Island. Under his direction steps are now being taken to reduce the incidence of the disease by the introduction of larvivorous fish into different waters, by minor drainage works, clearing drainage channels, and by oiling various collections of water that cannot be drained or filled in.

Report of the Malariologist for the year 1922 :—

*Staff.*—The Malariologist, 2 Medical Officers, 2 Entomological Assistants, 2 Laboratory Assistants, 1 mosquito catcher, and 1 cooly. In November, 1922, 6 additional Entomological Assistants and 3 mosquito catching coolies were appointed.

*Distribution of Staff.*—With the exception of the Entomological Assistants and mosquito catchers, the above officers are stationed in Colombo. Two Entomological Assistants and one cooly are stationed at each of the following towns : Anuradhapura, Kurunegala, Badulla, and Jaffna.

**Summary of Work.**

1. During the past year the investigations into malaria commenced subsequent to June, 1921, have been completed or continued, and additional lines of research work undertaken. With the extension of the field staff in November, 1922, work of a more specific nature was instituted in some of the larger towns, and temporary laboratories attached to the hospitals were opened at Anuradhapura, Kurunegala, Badulla, and Jaffna. No large scale anti-malaria works have yet been inaugurated ; but preventive measures have been introduced at Mahara Jail and Kurunegala, and it is hoped shortly, in conjunction with the local authorities, to extend them to the above towns.

2. Work during 1922 may conveniently be classed under three heads according as it relates to (A) the malaria problem in general ; (B) the malaria problem in towns ; and (C) malaria in particular places or areas. Work under head (B) might strictly be included under head (A) since it forms part of the general inquiry, and will be extended to other towns as early as possible. Work under head (C) was of a special and more limited nature, and was undertaken at the request of Government.





## (A).—WORK RELATING TO THE MALARIA PROBLEM IN GENERAL.

3. The incidence of malaria and the prevalence and distribution of the various forms of the disease throughout the Island.

This inquiry was commenced in July, 1921, and completed in July, 1922. Spleen and blood examinations of random samples of the inhabitants of all the more easily accessible towns and villages were made. For the most part school children under 12 years of age were examined, but in sparsely populated districts, village children and adults were included. In all 39,417 children, 4,732 adults, and 3,503 blood films were examined; maps showing the detailed results and approximate zones of incidence (at intervals of 10 per cent.) have been prepared. The general results for each Province are given in the following table:—

Province.	Children. examined.	Spleen Rate.	Films examined.	Parasite Rate.	Percentage Infections.		
					S. T.*	M. T.*	Q.*
Western ..	13,402 ..	1·1 ..	1,554 ..	1·8 ..	95·3 ..	2·4 ..	2·3
Southern ..	5,635 ..	7·8 ..	170 ..	4·7 ..	74·8 ..	— ..	25·2
Central ..	3,573 ..	8·1 ..	120 ..	10·9 ..	92·3 ..	— ..	7·7
Sabaragamuwa ..	4,086 ..	11·4 ..	257 ..	10·8 ..	85·1 ..	3·4 ..	11·3
Uva ..	1,368 ..	12·1 ..	433 ..	12·3 ..	74·6 ..	19·7 ..	5·7
Eastern ..	1,775 ..	19·0 ..	103 ..	13·6 ..	77·0 ..	— ..	23·0
Northern ..	3,889 ..	23·8 ..	266 ..	14·6 ..	59·5 ..	21·8 ..	18·6
North-Western ..	4,079 ..	33·3 ..	251 ..	19·5 ..	78·7 ..	14·8 ..	6·4
North-Central ..	1,610 ..	57·2 ..	349 ..	20·9 ..	71·8 ..	25·1 ..	3·1
Island ..	39,417	12·3	3,503	8·5	77·4	15·8	6·8

A much more accurate estimate of the general distribution of malaria is obtained from an examination of the maps referred to above than from the purely arbitrary analysis given in the table. An examination of the map representing the approximate zones of incidence shows that the greater part of the Island may be included in two categories (a) that in which the endemic index does not exceed 10 per cent., and (b) that in which the endemic index exceeds 40 per cent. The former includes most of the Western Province, a large portion of the Southern Province, and the hill-country above altitudes of approximately 2,500 to 3,000 feet. The latter includes the south-east, and east (except a narrow belt along the coast line), and excluding the Jaffna District, Trincomalee, Mannar town, and one or two smaller areas, the whole of the Island north of a line drawn from Chilaw to Batticaloa. The country included under this category is, for the most part, sparsely populated and clothed with jungle; the annual rainfall varies from 25 to 100 inches, and falls almost entirely during the north-east monsoon. The area under category (a) is much more densely populated and extensively cultivated; it receives a heavier annual rainfall (75 to 200 inches), and is to a large extent subject to both the south-west and the north-east monsoons. The low-country (Western Province and south-west of the Southern Province), included under this category, is comparatively free from malaria; north of the Kelani river the incidence gradually rises, and in the neighbourhood of the Maha-oya varies from 10 per cent. to 30 per cent. In the North-Western Province the endemic index varies considerably, but shows a marked increase northwards as the drier zones are approached. Of the larger towns (population over 3,000) an endemic index of 10 per cent. or more was found at Anuradhapura (49·4); Chilaw (42·1); Kurunegala (30·7); Hambantota (22·8); Batticaloa (20·5); Badulla (15·0); Ratnapura (12·2); Mannar (11·8); and Puttalam (11·2).

The most prevalent type of malaria was benign tertian which was responsible for 77 per cent. of the infections diagnosed; sub-tertian (malignant) malaria was responsible for 16 per cent., and quartan malaria for 7 per cent. Increased prevalence of sub-tertian malaria was observed in the North-Central (25 per cent.), Northern (22 per cent.), and Uva (19·7 per cent.) Provinces, and of quartan malaria in the Southern (25 per cent.), Eastern (23 per cent.), and Northern (18·6 per cent.) Provinces.

Fifteen species of anopheles have so far been found in Ceylon; three of these, *A. aitkeni*, *A. laucosphyrus*, and *A. pseudobarbistrois*, have not previously been recorded, although the first two have been found by Mr. R. Senior-White. *A. ludlowi*, an important malaria carrying species, recorded from Colombo by Lieut.-Col. James in 1913 has not since been found, and is not included above. The most abundant species are *A. barbistrois*, *A. culicifacies*, *A. jancsi*, *A. minimus (listoni)*, *A. sinensis*, and *A. subpictus (rossi)*; at altitudes over 400 feet *A. maculatus* commonly occurs. The chief malaria-carrying species appear to be *A. culicifacies*, *A. minimus*, and *A. maculatus*, but further research is necessary before definite statements regarding the other common species can be made. *A. culicifacies* is most prevalent in the northern half of the Island, but occurs also in the wet zone and in the hill-country (at least up to 2,400 feet); its distribution in the wet zone appears to be of a restricted and local nature, in the Western Province it has been found only in Colombo and Mahara. *A. minimus* is very widely distributed throughout the Island and has been found at an altitude of 2,800 feet.

Considerable data and information relating to the distribution and bionomics of the various species of anopheles and other mosquitoes have been obtained and catalogued; and named and mounted collections have been formed for purposes of reference, teaching and exhibition. Methods of identifying the indigenous anopheles in both adult and larval stages have been elaborated. The identification of larvae is of much practical importance, and considerable time was devoted to this work; in all cases in which determinations have been made, the accuracy of initial identifications was ensured by diagnosis from larval pelts with which adult correlation had been obtained.

*Paddy Cultivation and Malaria.*—Investigations, qualitative and quantitative in nature, are being made at Jaffna, Anuradhapura, Kurunegala, Polgahawela, Chilaw, Kadugannawa, Rambukkana, Gampola, Nawalapitiya, Badulla, Batticaloa, Matara, and Minuwangoda. This work was commenced in August 1922, and will be continued for at least one year in order that all conditions, e.g., seasonal changes, methods of cultivation, periods of growth of crops, water supply, &c., likely to influence the breeding habits of the paddy field anopheles may be examined. In each of the above towns three blocks of paddy fields situated in different localities are under observation; in all, 106 fields are examined every month. Anopheles breed in all these fields and form from 60 per cent. to 90 per cent. of the mosquitoes present. *A. rossi* and *A. sinensis* have so far been found to predominate, but there is considerable variation in different places, *A. minimus* is abundant in fields at Anuradhapura, and may form as much as 40 per cent. of the anopheles present; *A. maculatus* occurs in many fields at elevations over 400 feet.

The incidence of malaria among persons living near paddy fields at the above towns is being investigated. At present a total of 1,147 children and 243 blood films have been examined.

\* S. T. signifies simple or benign tertian; M. T. malignant or sub-tertian; and Q. quartan malaria.







*Larvivorous fish*.—Collections of larvivorous fish from different parts of the island have been made and submitted to Dr. H. Malpas for identification. Particular attention has been paid to the species *Haplochilus lineatus* common in the Western Province; and its exact distribution and possible correlation with the incidence of malaria is being determined. Results at present obtained indicate that it does not occur far north of the Malia-oya or east of Ratnapura, and that as it becomes less abundant malaria increases; it extends at least as far south as Kalutara. Attempts are being made to establish the above indigenous species, and the West Indian “Millions” (*Gambusia affinis*) in districts in which malaria is intense and larvivorous fish appear to be relatively scanty. Nurseries have been formed at Talaimannar, Ratmale colony, Anuradhapura, Kurunegala, and Mathara Jail; and “Millions” have been also introduced into wells at the Quarantine Camp, Mandapam, South India.

(B).—MALARIA IN TOWNS.

Detailed malaria surveys with particular reference to local conditions are being made at Anuradhapura (including the colony at Ratmale), Kurunegala, Badulla, and Jaffna. Work at Anuradhapura was commenced in April, and at the remaining towns in November and December, 1922. At each of these centres the area comprised within the town limits has been, or is being, surveyed for breeding places of anopheles; the larvæ obtained from each breeding place have been identified, and the results plotted on maps. The determination, by examination of the resident population, of the malaria incidence and its localized distribution has also been made at each town. These and other lines of work relating to the bionomics and carriage of malaria by the various anopheles present have so far involved the examination of 5,028 persons, 2,300 collections of water, 25,000 (approximate) mosquitoes and their larvæ, and 1,238 blood films.

(a) *Anuradhapura*.—The mosquito and incidence surveys have been completed, and all breeding places of dangerous species recorded.

The endemic index in the Local Board area averaged 49·4 per cent., with extremes of 32·5 per cent. and 70·6 per cent.; the lowest figure was obtained in the bazaar area, the highest at Bulankulam. The spleen rates in adults were also very high, averaging 42 per cent., with extremes of 32·8 per cent. (bazaar area and Roman Catholic Industrial School) and 77 per cent. (Isurumuniyagala). In the surrounding country—villages situated within a radius of 10 miles—the endemic index averaged 62·4 per cent. The parasite rate of the resident population averaged 17·3 per cent.; benign tertian parasites were present in 53 per cent. of the cases diagnosed, sub-tertian in 26 per cent. and quartan in 21 per cent. Nine species of anopheles mosquitoes have been found breeding within the town limits. The most abundant species were *A. minimus*, *A. subpictus* (*rossi*), *A. sinensis*, *A. culicifacies*, and *A. barbirostris*. The order of prevalence (larval) of these anopheles was found to vary considerably during the dry and wet seasons; giving the commonest species an index figure of 100, the relative abundance was as follows:—

Dry Season. (April–August).		Wet Season. (October–December).	
<i>A. minimus</i>	.. 100·0	<i>A. subpictus</i>	.. 100·0
<i>A. barbirostris</i>	.. 90·4	<i>A. minimus</i>	.. 84·0
<i>A. subpictus</i>	.. 75·0	<i>A. sinensis</i>	.. 72·0
<i>A. sinensis</i>	.. 42·8	<i>A. culicifacies</i>	.. 69·3
<i>A. culicifacies</i>	.. 11·9	<i>A. barbirostris</i>	.. 53·3

The most notable difference is the great increase in the prevalence of larvæ of the important malaria-carrying species *A. culicifacies* during the rainy season. With the advent of the rains not only did breeding become more extensive, and the actual numbers of breeding places increase enormously, but the relative prevalence of larvæ became much greater. In the dry season larvæ of anopheles were found in 50 per cent. of the situations examined, of *A. minimus* in 21 per cent. and of *A. culicifacies* in only 2·5 per cent.; in the wet season the respective figures were 80 per cent. (approximate), 32 per cent., and 26 per cent. The chief breeding places of *A. minimus* and *A. culicifacies* during the wet season, and the percentage frequency of occurrence of these two species were as follows:—

Situation.	<i>A. minimus.</i> Per Cent.	<i>A. culicifacies.</i> Per Cent.	Situation.	<i>A. minimus.</i> Per Cent.	<i>A. culicifacies.</i> Per Cent.
Wells	.. 60	.. 11	Pokunas and pools	.. 32	.. 28
Streams	.. 50	.. 25	Paddy fields	.. 10	.. 32
Water collections in			Irrigation channels	.. 30	.. 25
and around ruins	18	.. 54	Swamps	.. 22	.. 30

The frequency of occurrence of larvæ of these anopheles in the different situations varied somewhat with the season; allowing for the general increase in larval prevalence mentioned above, the most notable variation appeared to be in regard to *A. minimus* and paddy fields, where in the dry season this species occurred in 40 per cent. of the fields examined.

The investigations at Anuradhapura are not yet completed, but the results so far obtained are disquieting and show that successful malaria control will prove a very difficult problem. Indeed in the case of this town the feasibility of anti-mosquito work as the chief method of control can only be decided by further research and very careful consideration of the factors involved. The extensiveness and rural nature of town area, and particularly the association of the two chief malaria-carrying mosquitoes with works of economic importance or interest to man are obstacles which will be difficult to overcome.

(b) At Kurunegala, Badulla, and Jaffna, approximately one-half of the town areas have been surveyed for breeding places of anopheles, and work in connection with the incidence and local distribution of malaria is proceeding. At Kurunegala the local authorities have organized mosquito-brigades which work in association with this office. A report on malaria at Badulla with special reference to the epidemic during September to December, 1922, has been submitted to Government. Investigations at this town showed that the epidemic was largely due to malaria, but the evidence obtained indicated that it was not entirely of local origin; it was considered probable that the return in August and September of large numbers of pilgrims from the Kataragama festival exerted an important influence upon the matter.

The endemic index at Badulla was found to be approximately 15 per cent., indicating an area of moderate endemicity—and the spleen rate in adults 6 per cent. The parasite rate averaged 14·3 per cent., but in view of the fact that the examinations were made during the epidemic this result is probably above normal. The incidence of the disease was fairly uniform throughout the town; a slight increase occurred in the bazaar area.

Eight species of anopheles have so far been found breeding within the Local Board area. At this season (November and December) *A. subpictus* and *A. sinensis* were the predominant forms; *A. maculatus*, *A. minimus*, and *A. culicifacies* were also present, but were much less abundant. Larvæ of the last three important species were found only in 7 per cent. of the various collections of water examined; *A. maculatus*, the “hill-carrying” species, was more abundant than either of the others. All of the above-mentioned species occurred in paddy fields as well as in other situations, but the more dangerous forms were found to a relatively greater extent in wells (17·5 per cent.), pools (12·8 per cent.), and swamps (12·5 per cent.).







## (C).—MALARIA IN PARTICULAR AREAS.

Investigations into malaria have been made at Talaimannar and Mahara Jail and Mandapam Camp, South India, and reports submitted to Government. At Mahara, malaria in an intense form was found to be confined to the jail premises and immediate neighbourhood; the incidence of the disease in the surrounding country (radius 5 to 6 miles) was low, averaging 2 to 3 per cent. This was largely due to (1) the continued presence and close association of a large body of prisoners, drawn from all parts of the Island, and invariably including a number of human reservoirs of malaria parasites (parasite rate September 32·5 per cent.); (2) the presence, in the immediate proximity, of quarries in which two effective carriers (*A. culicifacies* and *A. minimus*) were breeding extensively; (3) the presence of an abundant food supply (the blood of persons living in the jail) for the anophelid mosquitoes close to their chief breeding places; and (4) the relatively sparse population and scattered distribution of dwellings in the surrounding district. In view of these facts there is every reason to hope that a considerable reduction in the amount of malaria be found in the near future. Preventive measures were instituted in October, 1922, anti-mosquito work in the quarry being carried out by the Harbour Engineer's Department. Considerable progress has been made, and it is hoped that the work will be completed in the course of the next few months.

HENRY F. CARTER,  
Malariologist.

Colombo, March 28, 1923.

10. *Plague*.—The number of cases was 160 in 1922, as compared with 187 in 1921 and 369 in 1920; of these cases, 150 proved fatal, as compared with 171 in 1921 and 316 in 1920. Of the 160 cases, 136 occurred in Colombo, of whom 131 died. The male cases were 115, as against 21 females.

An outbreak fortunately limited to 16 cases in all occurred in the town of Galle in September. Energetic measures were taken by the Sanitary Department to stamp out the disease, and this was satisfactorily accomplished within a few weeks. The occurrence of the disease has had the advantage of impressing on the local authorities in Galle the need for material improvement in the general sanitation of the town, and steps are being taken to improve matters in that respect.

11. *Cholera*.—No cases of cholera occurred in 1922, and as there were no cases in 1921 the Island has been free of this disease for over two years.

12. *Smallpox*.—There were 337 cases in 1922 with 43 deaths in 1922, as against 18 cases in 1921 and 126 cases in 1920. A serious outbreak occurred in the Eastern Province in July, beginning in the village of Kattankudy and spreading from thence to many neighbouring villages. Owing to wilful concealment of cases, especially amongst the predominant Moorish population, much difficulty was experienced in dealing with the problem, and it was not until towards the end of September that the outbreak came to an end. In all, in that district, 229 cases were detected, of which 23 proved fatal. Extensive measures of vaccination and re-vaccination were carried out, no fewer than 54,742 cases being so dealt with. Much credit is due to Dr. Chellappah of the Sanitary Department, the Provincial Surgeon, and the staff engaged in this campaign for their work carried out under many difficulties.

A smaller outbreak occurred in the town of Kandy near the close of the year, and up to December 31, 24 cases were admitted to the Infectious Diseases Hospital, of whom 3 died. From Kandy several centres of infection arose by contacts escaping to neighbouring villages, and the disease was still present in several places in the Central Province at the end of the year, where there were 13 cases with 3 deaths.

In Colombo there were 34 cases with 7 deaths, and 7 cases were landed from steamers calling at the port. Again, in the Northern Province, there were 37 cases with 5 deaths at several different places, the infection in all cases being amongst recent arrivals from India. In the Province of Sabaragamuwa 6 cases occurred up to December 31 at Rambukkana.

13. *Vaccination*.—The vaccinating staff in 1922 consisted of 9 Provincial Inspectors of Vaccination and of 142 trained vaccinators under the supervision of the Provincial Surgeons. The total number of primary vaccinations was 129,290; of these, 120,289 were reported as successful, and in 7,941 cases the results were not determined. The percentage of successful primary vaccinations was 93·7 per cent. In Colombo 7,240 vaccinations were performed, of which 451 were done by the Municipal vaccinators and 6,789 by the Government vaccinators, who are responsible for primary vaccinations in the Municipality.

14. *Government Vaccine Establishment*.—The officer in charge (Mr. E. Burgess) reports that the number of calves received on hire from the contractor was 575, and of these, 542 were returned to him. Seed lymph for the vaccination of the calves was obtained from the Lister Institute of Preventive Medicine, London, and from the King Institute, Madras. A certain amount was also prepared locally. The total number of tubes of calf lymph issued during the year was 167,521. Of this number, 848 were sold, realizing a sum of Rs. 825, and 5,186 were issued to the Colombo Municipality. A large quantity was stored in bulk as a reserve supply.

15. *Enteric Fever*.—The number of new cases admitted to hospital during the year was 857, out of which 188 proved fatal. The admissions to the General Hospital, Colombo, were 297 and to the other hospitals in the Western Province 188, and to the hospitals in the Central Province 192. Very few cases were admitted to hospitals in the other Provinces, but it is probable that the prevalence of the disease in these other Provinces is greater than would appear from the hospital admissions. The following comparative table of cases treated in hospital for this and the two previous years is given:—

	1920.			1921.			1922.		
	Cases.	Deaths.		Cases.	Deaths.		Cases.	Deaths.	
General Hospital, Colombo .	319	129	..	309	102	..	292	95	
Western Province ..	274	69	..	214	56	..	188	33	
Central Province ..	173	20	..	174	40	..	142	29	
Northern Province ..	64	6	..	57	11	..	26	4	
Eastern Province ..	10	1	..	3	0	..	7	2	
Southern Province ..	153	34	..	94	18	..	78	11	
North-Western Province ..	13	5	..	7	2	..	16	7	
North-Central Province ..	23	4	..	13	4	..	8	2	
Province of Uva ..	15	2	..	9	3	..	10	2	
Province of Sabaragamuwa	33	10	..	23	6	..	33	3	







The Registrar-General's returns for the whole Island give a total of 542 fatal cases, as against 688 in 1921 and 871 in 1920. The figures, however, are unsatisfactory, as many cases returned as "pyrexia" were probably cases of enteric.

16. *Dysentery*.—There was a fall in the hospital admissions, the total being 3,446 with 673 deaths, as against 5,518 cases in 1921 and 4,290 in 1920.

The Registrar-General's returns give a total of 2,515 fatal cases, as against 4,225 in 1921 and 4,220 in 1920.

17. *Leprosy*.—The report of the Medical Officer in charge of the Leper Asylum at Hendala, Western Province, gives the following figures as regards 1922 :—

	Males.	Females.		Males.	Females.
Remained on December 31, 1921	407	98	Died	52	16
Admitted during 1922	101	16	Remained on December 31, 1922	406	97
Discharged	50	1			

Of the 117 admissions, 100 were new cases ; of these, 17 were of the tubercular type, 34 of the anesthetic type, and 49 of the mixed type.

The new admissions were from the following Provinces :—Western, 52 ; Central, 16 ; Southern, 17 ; North-Central, 1 ; North-Western, 5 ; Northern, 2 ; Sabaragamuwa, 4 ; Uva, 3. Of the 51 "discharged," 6 were granted permits for home isolation, 10 Indian Tamils were repatriated to India, and 35 absconded. Of the absconders, 18 returned of their own accord or were brought back by the police, and 17 are still at large.

A new Leper Asylum at Mantivu island, off the Eastern Province, was opened in November, 1921, and 59 cases were there in residence on December 31, 1921, and 70 new cases were admitted during the year. Of the total of 121 cases under treatment 8 were discharged, 5 died, and 116 remained on December 31, 1922.

Both at Hendala and at Mantivu the lepers are nursed by Religious Sisters with the help of male and female attendants, and too much praise cannot be given to these devoted ladies for the way they carry out this work.

A great deal of interest has been displayed, both in the medical and lay press owing to reports being made during the year of the curative properties of certain preparations of Chaulmogra oil in the treatment of leprosy. It is to be regretted that our experience in Ceylon has not substantiated these reports, for our results have been disappointing on the whole. In view of the importance of the subject, and the desire to do all that is possible for the unfortunate victims of the disease, it is proposed that the Superintendent of the Hendala Asylum (Dr. Pestonjee) should go to India at an early date and personally study the methods of the use of the newer preparations of the drug in several of the Leper Asylums of that country, where good results have been reported in quite a considerable proportion of cases.

18. *Anchylostomiasis*.—The following table illustrates the relative prevalence and mortality of this disease in the various provinces so far as can be judged from hospital admissions :—

	1919.		1920.		1921.		1922.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
General Hospital, Colombo	655	99	790	111	772	135	588	81
Western Province	1,776	317	1,831	287	1,619	250	1,575	156
Central Province	3,381	644	3,881	714	3,643	584	2,519	281
Southern Province	1,086	126	1,461	204	1,348	145	1,418	110
Province of Sabaragamuwa	1,362	192	1,579	292	1,728	271	1,579	155
North-Western Province	414	72	402	48	529	74	754	74
Province of Uva	743	132	1,076	255	968	194	827	111
Eastern Province	156	16	144	13	59	11	111	5
North-Central Province	74	6	112	13	197	29	42	2
Northern Province	137	10	138	6	219	29	405	7
	9,784	1,614	11,414	1,943	11,082	1,721	9,822	987

The above figures refer to cases of anchylostomiasis as the primary disease, but a large proportion of all cases admitted to hospital are infected with this disease and receive treatment for it. The figures for 1922 show a decided decrease in admissions, and an even more marked fall in the case of mortality. This points to a decided improvement in the amount of severe anchylostomiasis disease as distinguished from infection, for only the more severe cases of the disease seek admission to hospital. As will be seen from the report of the Director of the Anchylostomiasis Campaign given below, re-infection of cases apparently cured on a previous occasion is still prevalent, but re-infection, even if untreated, takes time to produce symptoms sufficiently marked as to make the sufferers seek admission to hospital. The lack of or the failure to use properly constructed latrines accounts for the large amount of re-infection. It is hoped and expected that hospital admissions and the total mortality will continue to fall, even though the problem of re-infection is not solved. The fall in hospital admissions, however, will probably continue to be less than what might be expected, because of the constant importation of coolly labourers from India, the great majority of whom are infected with the disease. It is hoped that it may yet be possible to reduce the mass infection of these coolies during their six days quarantine by treatment at Mandapam camp. This possibility is the greater owing to the recent introduction of a new remedy, Carbon Tetrachloride, now under trial, which has the advantage of not interfering with the ordinary dieting of these labourers. So far the trials of this new remedy have given very promising results. Some difficulty has been experienced in getting the drug in an absolutely pure form, free from the presence of small amounts of sulphur compounds.





The following is the report submitted by Dr. J. F. Docherty of the Rockefeller Foundation, showing the progress and activity in anchylostomiasis operations carried out in the Island during 1922 :—

ANCHYLOSTOMIASIS CAMPAIGNS IN CEYLON FOR YEAR 1922.

The following summary for the Year 1922 is based for the most part on the quarterly reports received from the field Directors.

I.—Introduction.

1. During the year 1922 the intensive campaigns, with the exception of treatments in Galle Jail, were confined to the Western Province, operations being carried on in Mahara and Welikada Jails and the village districts of Mirigama, Henaratgoda-Veyangoda-Minuwangoda, Wadduwa, and Panadure. In all 24,136 persons received 54,711 treatments, of which 1,499 were administered to 579 prisoners.

The Directors of the Hospital-Dispensary Campaign completed the programme in Western, Southern, North-Western, and North-Central Provinces, and were located in Sabaragamuwa and Northern Provinces at the end of the year. From them the following reports were received :—

Province.	First Treatment.	Subsequent Treatment.	Total Treatment.
Western .. ..	21,364	9,092	30,456
Southern .. ..	18,654	2,001	20,655
North-Western ..	17,387	2,592	19,979
North-Central ..	6,982	527	7,609
Sabaragamuwa ..	2,923	262	3,185
Northern .. ..	1,796	406	2,202
Total ..	69,106	14,980	84,086

The personnel required to carry on these campaigns consisted of four Directors, three Assistant Directors, and a subordinate staff of forty-seven ; this number was reduced to three Directors, three Assistant Directors, and 32 subordinates by June 1, while three more dispensers were released during the third quarter. The above refers only to the locally employed staff.

The hospitals and dispensaries in the various Provinces at the request of the Principal Medical Officer submitted monthly reports of treatments given during and after the campaign. In addition the annual reports received by the Medical Department included a statement of all treatments for anchylostomiasis, from which the following data was secured :—

Province.	First Treatment.	Subsequent Treatment.	Total Treatment.
Western .. ..	77,620	27,221	104,841
Southern .. ..	57,633	20,426	78,059
North-Western ..	57,517	11,584	69,101
North-Central ..	7,121	627	7,748
Sabaragamuwa ..	8,030	2,129	10,159
Northern .. ..	6,023	904	6,927
Uva .. ..	1,388	—	1,388
Eastern .. ..	359	—	359
Central .. ..	4,188	—	4,188
Total ..	219,879	62,891	282,770

The returns received from the estate hospitals and dispensaries show a decided increase over last year's reports, 18,530 coolies being treated during the year.

Total number of treatments given by all agencies during the year 1922 :—

Agency.	Number Treated.	Number of Treatments.
Villago and school campaigns*	23,557	53,212
Jails .. ..	579	1,499
Government hospitals and dispensaries ..	219,879	282,770
Estate hospitals and dispensaries .. ..	18,530	18,530
	262,545	356,011

II.—Personnel.

During the year 1922 the following changes were made in the International Health Board's representatives in Ceylon :—

- (1) Dr. C. N. Leach, who had been conducting research experiments in Kandy Jail, was transferred to the Philliphine Islands, March 1.
- (2) Dr. G. G. Hampton, late Director of the intensive village campaigns in the Triangular Area, left for Mauritius on May 1.
- (3) Dr. W. P. Jacocks, who had been in charge of all operations in Ceylon, returned to America on extended leave in June, being succeeded by Dr. J. F. Docherty, who arrived in the Island the first of April.

Of the locally employed staff Dr. Caldera was recalled by the Principal Civil Medical Officer on the appointment of Dr. Outshoorn to the Mirigama Campaign, March 1 ; while Dr. Willenberg, who had creditably conducted the Kalutara and Wadduwa Campaigns, was released on December 31, to permit him take over his duties as Port Surgeon.

\* This includes the treatments reported by the Directors of the Hospital-Dispensary Campaigns.





## III.—Area of Operations.

## (A) INTENSIVE CAMPAIGNS.

The Intensive Campaigns were confined to selected areas in the Western Province.

(1) *Wadduwa-Panadure*.—On the completion of the Kalutara area in 1921 it was decided to gradually extend operations towards Colombo, treating in all the villages along the Galle road. The dispensers were allotted to the Wadduwa district on the first of the year. Later the field was enlarged to include the town of Panadure, where a campaign had been carried on by Dr. Jayaram in 1921, but was only partially completed when the staff was released to curtail expenses. The combined areas lie between the 15th to 25th mileposts on the Colombo-Galle highway, and extend inland a distance of three to four miles, depending on the location of the estates. The approximate population is 36,000.

(2) *Minuwangoda-Veyangoda-Henarigoda*.—As stated in 1921 reports this area lies between the 16th and 26th milestones on the Colombo-Kandy road, and forms an isosceles triangle with Minuwangoda as its apex.

(3) *Mirigama Area* includes the major part of Hapitigam korale, and forms a rough triangle, bounded on the north and east by the Maha-oya, on the south by the Kandy road, and on the west by the railway line and the Mirigama-Giriulla road. It includes headmen's districts Nos. 1 to 30, with the exception of Nos. 3 to 8, and has a population of 16,000 located in 74 villages.

*Village Community Life*.—In the above-mentioned areas, the inhabitants are mostly low-country Sinhalese, who gain a livelihood working on the neighbouring rubber and coconut estates, cultivating paddy, trading in boutiques, fishing, and working in the arrack distilleries, though the latter two are denied the inland villager. The average worker seldom earns more than a rupee a day with which he supports his own family and, in many cases, some of his relatives. On this account the people generally, and the children especially, are ill-nourished and easy victims to any epidemic.

The villagers live in mud-thatched houses, which may belong to one person or a family, as many as ten occupying a single roomed hovel which is both ill-ventilated and poorly lighted. Each home in the village cluster is surrounded by a small compound with the inevitable coconut trees and bathing well. The compound is kept quite clean, but the latrine is an absent quantity unless recently visited by a sanitary officer, since the native prefers to use the nearby jungle or estate for such purposes.

The villager bathes many times per day for cooling as well as cleansing purposes, though, apparently, unable to appreciate the difference between the water from a filthy stagnant pool and that from the city's reservoir. Another feature, which appears to be peculiar to Ceylon, is the daily cleansing of teeth, the index finger and grit taking the place of our modern dental supplies.

The educational facilities, due to the carefully laid and farsighted plans of the Government Agent are most praise-worthy, since there is sufficient number of Government schools built on modern plans to accommodate most districts; in these both English and the vernacular are taught, and it is noted that the Ceylonese appreciate these opportunities in voluntarily sending their children for instruction.

*Method of Treatment*.—The intensive plan as outlined in last year's report was the only method of treatment employed in the village campaigns, since it was felt that the majority of the villagers in the Western Province possessed a fair knowledge of anchylostomiasis. Small areas of approximately 16,000 population were selected, and to each of them assigned one Director, one Assistant Director, eight dispensers, and the necessary sub-staff. The Director's office was situated at the most central point so as to facilitate the visiting of the dispensers, who were billeted at the Police Vidane's bungalow, in order to be assured of his assistance, while at the same time to secure accommodation at the largest and most accessible home in the district.

The Directors in charge of the campaigns spent the first month in educational activities, while the dispensers accompanied by the headmen, each dispenser being allotted a definite section in which the dispensaries were later located. Following the census the dispensaries were opened, each dispenser being in charge of from two to six stations, depending on the population of the centre, and at these treatment was given from one to three times per week. The Directors visited all dispensaries daily, examined all persons applying for treatment, and prescribed the dosage of the vermifuge, as well as giving demonstrations when thought necessary.

As the usual rumours are invariably revived in new areas a demonstration of the harmlessness of the treatment was given in each division, the headman taking the vermifuge in the presence of his charges; in most cases this convinced the villagers, though a few desired proof of infection necessitating microscopic demonstrations. This plan was also adopted in the schools, the masters being requested to take treatment first in order to reassure the children.

*Drugs used*.—Oil of chenopodium was used practically entirely, since the results obtained by this anthelmintic were found to be much more uniform than from any other. In a few instances thymol and beta naphthol were prescribed by the Directors, but only in those cases where owing to the physical condition of the patient it was considered unwise to give the more reliable drug. No preliminary purge was administered, though all were instructed to refrain from eating on the morning they applied for treatment.

On the basis of Hampton's and Nicholls's report it was planned to introduce carbon tetrachloride into the field campaign, but the supplies received during the year proved on analysis to be impure containing a small percentage of sulphur compounds.

*Methods of approaching the People: Government Official Assistance*.—The Government and the Assistant Government Agents of the Western Province have always shown the keenest interest in Anchylostomiasis Campaigns, being ever willing to render whatever assistance they could to make them a success, and it is admitted that without their co-operation our progress would have been greatly retarded, and the results obtained minimized. The Government Agent reaches the people through the Mudaliyar and his lieutenants, the headmen. The former is appointed by the Government and takes no small amount of pride in his position, while the latter are selected by the Mudaliyar from the best educated and the most progressive men in the district. In view of the trust placed in these Police Vidanes by the villager they can make the campaign either a success or a failure.

Another method of stimulating the interest of the headmen was by granting certificates of merit to all those who had induced 90 per cent. of the inhabitants of their villages to take treatment. This following the educative campaign produced a very keen rivalry among the headmen, several of whom received their rewards months before the campaign was completed.

*Schools*.—The schools in Ceylon, as elsewhere, have been found to be one of the best avenues of approaching the people, since the instructors being fairly well educated appreciate the value of the Anchylostomiasis Campaigns, and through their influence over their children convinced them of the advisability of taking treatment. This advice was carried to the parents by the children, with the result that the latter adopt a more sympathetic attitude. The assistance of the schoolmasters is obtained by personal application with the sanction of the Director of Education.

*Vedaralas*.—Until recently the vederala on account of his mysterious control over the people has been considered an obstacle to the progress of the Anchylostomiasis Campaign, but of late we have discovered in him a most valuable assistant, as was evidenced in the Mirigama area, when two vedaralas treated over a







thousand villagers under the supervision of the Directors. Other native physicians have applied for assistance in treating anchylostomiasis in their villages, being quite cognizant of our success and their liability to cure the disease.

#### (B) NON-INTENSIVE CAMPAIGNS.

When the intensive campaign units were transferred from estates to villages it was hoped that the Sanitary Department would be able to sanitize the areas selected, if not previously at least during the treatment, but it has soon become evident that the staff at the disposal of the Commissioner was much too small to cope with the situation; so in order to give the Department an opportunity to select and train men for the fields, a number of our dispensers were assigned to the Hospital-Dispensary Campaign.

Again, from preliminary examinations it has been ascertained that at least 93 per cent. of the non-shoe wearing population is infected with anchylostomiasis, though less than 25 per cent. show definite symptoms. The infection, however, decreases the resistance of the individual to other diseases, and consequently we find a fairly high morbidity rate in Ceylon. In addition it has been observed in many cases that the apothecaries, unable to make correct diagnoses, treat lesions produced by anchylostomiasis as specific, rather than as sequelæ, giving the patient but transient relief, and increasing the drain on the medical budgets. With these points in mind, and with the approbation of the Principal Civil Medical Officer, one Director and four dispensers were appointed to open the campaign in the Western Province on March 1, 1922. This number was increased to two Directors and eight dispensers on June 1 and to three Directors and twelve dispensers on October 1.

The dispensers were stationed at Government Medical Institutions for fourteen days, each group of four being supervised by one Director, who visited all the dispensaries daily. The duties of the dispensers were to instruct the apothecaries in charge in the methods of the anchylostomiasis diagnosis and treatment, at the same time assisting them to give the vermifuge to at least 75 per cent. of the physically fit out-patients, which percentage the apothecary had been instructed by the Principal Civil Medical Officer to treat, both during and after the campaign. It is hoped that by this method of treatment to reduce mass infection, decrease the number of visits to hospitals and dispensaries, and improve the general health of the people.

By shifting the dispensers every two weeks all hospitals and dispensaries in Western, Southern, North-Western, and North-Central, sixteen in Sabaragamuwa, and eight in Northern Provinces had been visited by the end of December. In June the reports submitted by the apothecaries in the Western Province proving unsatisfactory, six of the anchylostomiasis dispensers, released from the triangular area, were appointed to various dispensaries in the neighbourhood of Colombo under the supervision of the central office. When they were discontinued in August there was a decided improvement in the returns submitted.

#### IV.—Educational Methods.

1. *General.*—The Hospital Dispensary Campaign undoubtedly is the best educative attempt to date, since it served to introduce the full meaning of the word "Anchylostomiasis" to the most remote parts of the Island, as the dispensers in carrying out their duties gave the apothecaries detailed information regarding the infection, and the latter being the medical leaders of the district in which they were located, found little difficulty in convincing the out-patients of the advisability of taking the treatment.

##### 2. *Intensive.*—

##### (A) *Preliminary Measures.*

1. *The Kachcheri.*—Previous to the adoption of curative measures the Government Agent or the Assistant Government Agent advised the Mudaliyar, and through him, the headmen of the divisions of the proposed campaign and requested that they, as Government servants, should do all in their power to make it a success. In addition illustrated pamphlets in the vernacular giving a comprehensive view of anchylostomiasis were sent to all vidanes.

2. *Headmen's Meetings.*—At a later date the Mudaliyar called a meeting of the headmen of the district, at which the Director of the campaign was invited to give an illustrated lecture on anchylostomiasis, while the Assistant Government Agent, the Mudaliyar, and other prominent and progressive citizens addressed those present, advising them of their duties to the Directors, and the necessity of making the campaign a success.

3. *Director's Lectures.*—As previously stated during the first month the Directors and dispensers carried on a purely educative campaign, the former giving illustrated lectures in the various centres with the assistance of the Mudaliyar, while the latter, in making a census with the aid of the headmen, distributed campaign literature, and personally advised all interested.

##### (B) *Campaign Measures.*

These may be summarized very quickly since they are quite similar to the preliminary steps.

(1) Monthly meetings of the headmen at the Mudaliyar's office, when detailed reports of the work accomplished in each section were received and discussed.

(2) Illustrated lectures and demonstrations by the Directors in different schools and villages where interest in the campaign showed signs of diminishing.

(3) Distribution and reading of literature at the dispensaries; also microscopic and macroscopic demonstrations.

#### V.—Sanitation.

In Mirigama and the triangular area sanitation was carried on in conjunction with treatment, one inspector being appointed to each dispenser's district, with the result that when the campaign was terminated over 80 per cent. of the homes had been provided with latrines. In Wadduwa and Panadure sanitation had been practically completed when curative measures were adopted.

As the simultaneous method of treatment and sanitation has never been effective from the stand point of control, the only alternative was pre-sanitation, which, however, could not be carried out, while the number of inspectors available was less than half the number of dispensers already engaged in treatment. The Sanitary Department being unable to increase its staff rapidly it was decided to suspend the major part of the intensive work until such a time as the Commissioner would be able to completely sanitize selected areas six months in advance of treatment, the Anchylostomiasis Directors and dispensers being transferred to the Hospital-Dispensary Campaign.

In September the Commissioner advised the Department that only ten inspectors, in addition to those already appointed, could be allotted to the Anchylostomiasis Campaign during 1923; a few days later a second communication reported all appointments to the sanitary staff cancelled due to the Government retrenchment scheme. As this meant that the Anchylostomiasis Campaign programme for 1923 was in danger an appeal was made to the Acting Governor, with the result that 36 inspectors were granted, 24 being available on January 1, 1923. With the aid of these men it is expected that after June 1, 1923, treatment campaigns will be confined to sanitized areas, with the result that re-infection will be greatly reduced and anchylostomiasis control approximated.







The Inspectors are allotted as follows :—A village area of approximately 16,000 inhabitants or 3,500 homes is selected, and eight Inspectors are allowed six months to completely sanitise the district, at the end of which time four are transferred to new fields, the remainder being permanently appointed to that area to enforce the use of latrines and general sanitary regulations.

The course of lectures to headmen and vedaralas inaugurated by the Sanitary Commissioner in 1921 has been productive of very good results, a number of those attending having passed the required examination. These lectures have already been started in the Siyane korale, where sixteen of the permanent force have been carrying on the sanitary programme, which precedes the introduction of anchylostomiasis treatment. The intensive units commence operations in this korale on July 1, 1923.

#### (B) ESTATE SANITATION.

As the campaign was confined to the low-country villages it is impossible to form an opinion of the present state of the estate sanitation, though, if one can draw any conclusion from a few personal observations and statements made by visiting Medical Officers, one is forced to believe that this public health measure has been, for the most part, neglected. A few estates have considered the question of soil pollution very seriously, with the result that they report an improvement in the health of the cooly, as evidenced by the decreased cost of production and medical attention. It is hoped that in view of the improved economic condition of the estates due to the rapid rise in value of tea and rubber that the different companies will, in the future, enforce the construction and use of approved latrines.

#### VI.—Central Laboratory.

All microscopic examinations were made at the central office, two trained microscopists being employed during the first six months, and one only during the remainder of the year, since very few specimens were received after the Triangular and Wadduwa Campaigns were closed ; in addition, the villagers in the Mirigama district appear to be unwilling to submit the specimens, preferring additional treatment to accepting the tin containers.

Microscopic examinations were made, using the plain, centrifuge and Willis salt flotation smears, three negatives, with the last being accepted as freedom from infection. The annexed table shows the comparative value of the three methods.

Microscopical Examinations made during the Year 1922.

Month.	Preliminary Examination.		First Examination.		Second Examination.		Third Examination.		Fourth Examination.		Total.	Total Number of Specimens Centrifuged.	Results after Centrifuging.		Total Number of Specimens examined by Salt Flotation Method.	Result after Salt Flotation Method.	
	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.	Positive.	Negative.			Positive.	Negative.		Positive.	Negative.
January	66	9	217	58	—	—	29	59	—	—	438	216	55	161	161	35	126
February	96	9	160	29	56	4	11	7	—	—	372	146	45	101	101	52	49
March	356	22	12	19	16	9	7	9	—	—	450	118	22	96	96	37	59
April	210	15	25	51	24	4	2	—	1	—	332	110	25	85	85	15	70
May	158	9	10	—	2	9	—	—	—	—	188	34	6	28	28	10	18
June	67	7	19	1	—	—	—	—	—	—	94	23	9	14	14	6	18
July	53	6	—	—	2	6	—	—	—	—	67	25	4	21	21	9	12
August	146	20	—	—	4	7	—	—	—	—	177	55	13	42	42	15	27
September	258	*63	55	8	3	10	2	7	—	—	406	69	15	54	54	17	37
October	88	3	—	—	1	—	—	—	—	—	92	11	5	6	6	3	3
November	61	7	—	—	—	—	—	—	—	—	68	14	4	10	10	3	7
December†	1	3	—	—	—	—	—	—	—	—	4	3	—	3	3	—	3
	1560	173	498	166	108	49	51	82	1	—	2,688	824	203	621	621	202	419

#### VII.—Carbon Tetrachloride.

Early in the year it was decided to test the properties of carbon tetrachloride, paying special attention to its action on the organ of the body, as a condemned prisoner at Kandy had volunteered to take any treatment requested. He was given six C.C.'s twenty days previous to execution, the dose being repeated thirteen days later. At autopsy the intestinal contents was examined and found free from hookworm, while on microscopical examination no pathological change could be detected in either the kidneys or liver.

The children in two Government schools were treated at a later date, each child receiving one dose of one to three C.C.'s of the drug on an empty stomach, no post purge being administered. The students were permitted to carry on their daily duties in the class rooms and fields, and in one case only was there any evidence of discomfort. Re-examination of the faeces ten days later by the Willis flotation method revealed 89 per cent. of the children cured. In addition, a number of sick emaciated children in the hospital were treated without any mal-effects, the results obtained being excellent.

In August condemned prisoners once more came to our assistance, three being treated as follows :—

- Received five C. C.'s at eight A.M., no food being allowed, and four hours later a purge of Epsom salts.
- Received five C. C.'s at same hour, and eight hours later the saline.
- Received eight C. C.'s in two doses of five and three, no purge being administered; interval between treatment was three days.

At autopsy the intestinal contents of all were examined, and in no case was a single hookworm found, though trichuris and oxyuris were seen attached to the walls. Microscopical examinations of the liver demonstrated degeneration in both (B) and (C), but none in (A). From this it was concluded that the maximum dose should not exceed three C. C.'s for forty-five minims.

\* Fifty-one negative which were found by direct smear were not examined by salt flotation method.

† Laboratory was closed from December 18 to January 3 for vacation.





During the last quarter an attempt was made to estimate the comparative anthelmintic value of carbon tetrachloride, beta naphthol, thymol, and oil of chenopodium; 579 prisoners in Welikada, Galle, and Mahara Jails receiving 1,481 treatments. The figures listed below apply to those who completed the full course of treatment, a number being excused for various reasons.

Percentage comparison of Worms Received.

Drugs used.	First Treatment.		Second Treatment.		Third Treatment.	
	Per Cent.		Per Cent.		Per Cent.	
Chenopodium ..	..	81.4	..	94.6	..	97.1
Thymol ..	..	84.2	..	94.9	..	97.4
Beta naphthol ..	..	92.2	..	97.3	..	99.7
Carbon tetrachloride ..	..	98.3	..	99.6	..	—

Percentage of Apparent Cures.

		Per Cent.		Per Cent.		Per Cent.
Chenopodium ..	..	35.9	..	58.9	..	87.2
Thymol ..	..	25.0	..	55.5	..	86.1
Beta naphthol ..	..	39.6	..	67.0	..	86.7
Carbon tetrachloride ..	..	58.2	..	83.6	..	—

The dosage used was chenopodium twenty-four minims in two doses ; beta naphthol forty grains in one dose ; thymol forty grains in two doses ; carbon tetrachloride forty-five minims in one dose. In all cases a purge of Epson salts was given two hours after last treatment.

19. *Diphtheria*.—Forty-six cases were treated in Government hospitals with two deaths, in several of these cases the diagnosis was not confirmed by microscopical or cultural tests.

20. *Parangi (Framboesia, or Yaws)*.—There was a great increase in the number of hospital admissions, due to the increasing realization by sufferers, from this disease, of the great benefit to be derived from the facilities now available in all hospitals for treatment by modern methods. The local prevalence of the disease so far as can be judged from hospital admissions is shown in the following table :—

	1919.		1920.		1921.		1922.
General Hospital, Colombo ..	120	..	102	..	267	..	306
Western Province ..	439	..	601	..	1,096	..	1,499
Central Province ..	673	..	1,275	..	1,202	..	1,312
Northern Province ..	168	..	157	..	102	..	504
Eastern Province ..	470	..	749	..	791	..	646
Southern Province ..	725	..	783	..	1,093	..	5,085
North-Western Province ..	712	..	659	..	711	..	784
North-Central Province ..	455	..	301	..	374	..	594
Province of Uva ..	760	..	733	..	684	..	594
Province of Sabaragamuwa ..	748	..	824	..	1,841	..	2,221
	5,270		6,184		8,161		13,545

Apart from hospital admissions, a large number of cases are treated by the older methods at dispensaries throughout the Island. In addition, a special campaign is carried on by three Itinerating Medical Officers detailed for work amongst villagers who cannot or will not seek admission to hospital. One of these officers in the North-Western Province treated 4,422 cases, another in the Eastern Province treated 1,038 cases, and the third in Uva treated 798 cases ; the work of the latter two officers was interrupted for various reasons during part of the year. The results of this treatment and the readiness of villagers in out-of-the-way places to be treated afford ample testimony of the need for a more extensive and sustained campaign to deal with this scourge. The results of modern treatment are so eminently satisfactory that it is hoped and expected that no financial considerations will be allowed to stand in the way of an increased staff for itinerating work and the establishment, on a wider foundation, of a campaign to deal with this disease.

It is seldom that the expenditure of public funds on medical work can show such rapid and decided benefit as is to be seen in this particular work. The only difficulty in the work is that one dose of the remedy produces such marked benefit that some patients do not trouble to submit themselves for the further treatment necessary to effect a cure or prevent a relapse.

Apart from hospital cases, some 58,299 patients received other forms of treatment at the various dispensaries, and this figure gives some idea of the wide prevalence of the disease.

The dispensary cases as regards Provinces were as follows :—

Western 3,271, Central 3,629, Northern 1,204, Eastern 5,838, Southern 10,192, North-Western 13,592, North-Central 15,373, Uva 2,246, Sabaragamuwa 2,954.

No less than 32,840 doses of salvarsan (or its homologues) were issued from the Civil Medical Stores mainly for the treatment of parangi. Mention should be made of the fact that a private practitioner, Dr. J. A. E. Corea, treated 740 cases amongst villagers in the North-Western Province with drugs supplied by Government.

21. *Cancer or Sarcoma*.—The number of cases of malignant disease treated in the various hospitals was 463 with 79 deaths, as against 395 cases with 64 deaths in 1921, and 617 with 76 deaths in 1920. Many cases unfortunately only enter hospital when the disease is in an advanced stage.





22. *Tubercular Disease of the Lungs (Pulmonary Phthisis)*.—The number of hospital admissions was 3,308, of whom 865 died, as compared with 3,353 with 881 deaths in 1921 and with 2,870 cases with 660 deaths in 1920. The Provincial distribution of these hospital cases was as under :—

	Cases.	Deaths.		Cases.	Deaths.
General Hospital, Colombo ..	527 ..	232	Southern Province ..	397 ..	47
Western Province ..	1,411 ..	326	North-Western Province ..	178 ..	54
Central Province ..	222 ..	73	North-Central Province ..	2 ..	—
Northern Province ..	59 ..	3	Province of Uva ..	213 ..	33
Eastern Province ..	42 ..	14	Province of Sabaragamuwa ..	206 ..	48

Apart from the large number of chronic cases admitted to the tuberculosis wards of the General Hospital, Colombo, for want of accommodation elsewhere, there are three special institutions maintained for dealing with this disease, viz., the Anti-Tuberculosis Institute in Colombo, the sanatorium for early cases at Kandana, and the hospital at Ragama for advanced cases.

*At the Institute in Colombo*.—The number of new cases seen was 3,000, as compared with 2,785 in 1921 and 2,196 in 1920. Of these, 1,000 cases were sent to the chronic hospital at Ragama and 152 to the sanatorium at Kandana. The accommodation at Ragama (250 beds) is insufficient for the number of cases recommended for admission there and, as stated above, a large number have to be accommodated at the General Hospital.

*At the Kandana Sanatorium (54 beds)*.—152 cases were admitted during the year (84 males and 68 females), and these with 32 remaining on December 31, 1921, made a total of 184 cases under treatment. Of the admissions, 130 were from the Western Province. Of the cases under treatment, 136 were discharged, 5 were transferred to Ragama, 3 died, and 40 remained on December 31, 1922. The average duration of stay in hospital of each patient was 84 days. Amongst those discharged in 56 cases the disease was described as being arrested, in 38 cases much improvement, in 30 cases improvement, and in 15 cases no improvement was reported.

*At the Chronic Hospital, Ragama (258 beds)*.—The number of cases under treatment was 1,204; and of these, 231 cases died. The cases were admitted through the Anti-Tuberculosis Institute in Colombo almost entirely, and practically all were advanced cases. The accommodation was increased by 24 beds during the year, but further accommodation is still needed, and so also is improvement to existing buildings in the way of replacing the old type of wards by an improved type.

In connection with the problem of dealing with cases of tuberculosis it is desirable that a sanatorium and a hospital be erected in the Northern Province, as the existing institutions mainly serve the Western Province.

23. *Port Health Precautions*.—During the year 2,323 British and Foreign steamers and 281 native sailing crafts called at the port of Colombo and were inspected, as against 2,338 steamers and 261 sailing vessels in 1921. Seven steamers were placed in strict quarantine, as they had cases of smallpox on board, one each on 6 ships and 2 on the other. These cases were landed and sent to the Infectious Diseases Hospital. One case of convalescent scarlet fever and 3 cases of chickenpox were also landed. Some 3,198 persons were vaccinated, either at Port Surgeon's Office or at the disinfecting station in connection with the port. Men sent from India to join the crew of ships expected to arrive in Colombo are vaccinated at Mandapam Camp, and kept under surveillance in quarters at the base of the breakwater before being signed on. At the Port Venereal Clinic for seamen 82 cases of syphilis were treated by intravenous injection. Disinfection of the clothing and persons of 4,635 tally clerks, 54,248 cargo coolies, 13,815 coaling coolies, and 61,348 passengers was carried out at the port disinfecting station.

### SECTION III.—METEOROLOGY.

24. *Rainfall*.—The areas whose total rainfall for the year 1922 was above average include most of the east and north-east coast and most of the west coast from Kalutara to Mannar, except for the neighbourhood of Chilaw. Inland there was an area above average stretching north-eastward from Negombo to Kurunegala and also a strip on the exposed south-west face of the main hills, although there was a deficit on both sides of this strip, i.e., in the low-country of Sabaragamuwa and among the central ranges. Another district where averages were reached was in the extreme south-east of the hill-country near Koslanda. In the remainder of the Island, which amounts to a good deal more in extent than the areas mentioned above, the rainfall of 1922 was below average.

During the south-west monsoon the wind was rather above normal strength, and for those months there was a marked excess of rain on a narrow belt on the south-west face of the hills, and a marked deficit in most of the remainder of the Island amounting at some places to a severe drought. Turning to questions of absolute quantity the new station at Blackwater estate (Nawalapitiya) heads the list with 228·4 inches on 217 rainy days, Carney estate (Ratnapura) being second with 221·7 inches on 230 rainy days, and an average of 215·8 on 227 days. At the other end, Hambantota (33·6 on 101 days) and Ambalantota (27·6 inches on 72 days) were the lowest; though Marichehukkaddi, which recorded 39·9 inches on 53 days this year still holds the lowest average, namely, 33·6 inches in 56 days. The longest period of consecutive wet days was 47 at Elpitiya. Several stations in the north-north-west and south-east of the Island recorded hardly anything during the south-west monsoon, but it is hard to give figures with confidence for the precise number of consecutive days without any rain.

The rainfall at Colombo (Cinnamon Gardens) was 87·82 inches in 169 days or 8·31 inches above average. At Kandy 79·35 inches were registered in 184 days, while the rainfall at Nuwara Eliya was 92·47 inches in 219 days.

*Temperature*.—The station showing the highest mean shade temperature for the year was Trincomalee with 83·0° F., and the lowest Nuwara Eliya with 59·6° F. The figures for Colombo and Kandy were 80·7° F. and 76·4° F., respectively.

The highest shade temperature recorded during the year was 101·3° F. at Kurunegala on April 1. The highest on record is 103·7° F. at Trincomalee on May 12, 1890. The lowest this year was 31·5° F. at Nuwara Eliya (6,000 feet above sea level) on February 24, at which station 27·1 was recorded in 1914. The highest shade temperature at Colombo in 1922 was 95·5° F. on April 5, and the lowest 65·1 on December 10 and 13.







The mean daily range, *i.e.*, the difference between the mean of the maximum and the mean of the minimum, was highest at Badulla, 18·6° F., and the lowest at Galle, 8·1° F. At Colombo and Kandy it was 12·2° F. and 15·5° F., respectively. The absolute range for the year, *i.e.*, the difference between the highest and the lowest readings, actually recorded at any one station, was greatest at Nuwara Eliya 46·7° F.), and lowest at Galle (22·9° F.).

The mean annual temperatures were a trifle below average at the west coast stations and a trifle above elsewhere. Galle (0·6° F.) was the only station whose off set for the year in either direction was so much as half a degree. In January no station was below its average, and in December all stations were below, in most cases by about a degree.

SECTION IV.—THE SANITARY BRANCH OF THE MEDICAL DEPARTMENT.

25. The following report of the year's activities is submitted by Dr. J. F. E. Bridger, Sanitary Commissioner :—

1. *Staff of the Sanitary Branch.*—A Sanitary Commissioner, an Assistant Sanitary Commissioner, 7 Sanitary Officers, a Sanitary Engineer, Sanitary Superintendent, 103 Sanitary Inspectors, 10 disinfecting orderlies, 4 survey coolies attached to the Sanitary Engineer, a rat-gang consisting of an overseer and 3 coolies, and a gang of 10 coolies and a kangany attached to the Railway Sanitary Inspector doing anti-malaria work.

2. *Additional appointments and Transfers.*—Dr. S. T. Gunasekara, the Assistant Sanitary Commissioner, returned to the Island on June 19 and resumed duties the next day, relieving Dr. G. W. R. Fernando, who was acting for him. Dr. D. C. de Fonseka, Railway Sanitary Officer, went on long leave on April 4 and returned to the Island on November 22. During his absence Dr. S. Somasundaram, Sanitary Officer, acted for him. Dr. F. N. Jayawardane was appointed a Sanitary Officer on April 3, and succeeded Dr. Somasundaram. Mr. D. A. Fonseka, Sanitary Inspector, Cotta, was appointed Supervising Sanitary Inspector, Kalutara District, on December 5. 12 new Sanitary Inspectors were appointed during the year.

3. *Office Staff.*—Government having authorized the provision in the 1922–23 estimates for one clerk in class II., grade III., and one in grade II. of the Subordinate Clerical Service, Mr. O. H. Amarasekara, Head Clerk, Provincial Road Committee, Badulla, was appointed by Government as second clerk of this office with effect from November 1, 1922. Mr. D. T. Atukorala, Assistant Recordkeeper of the Principal Civil Medical Officer's Office, was appointed Recordkeeper of this office with effect from November 1, 1922.

The services of a clerk were given to the Sanitary Officer, Kalutara, in November.

4. *Training Class.*—A class for the training of Sanitary Inspectors was formed on June 1 with 35 students, who were given instructions for six months. An examination was held at the end of November, and 26 men qualified as Sanitary Inspectors.

5. *Distribution of Staff.*—The following officers are stationed in Colombo :—The Sanitary Commissioner; the Assistant Sanitary Commissioner; 2 Sanitary Officers attached to Head Office; 2 Sanitary Officers of the Colombo District; Sanitary Officer, Railway Sanitation; Sanitary Engineer; and Sanitary Superintendent. The Sanitary Officer, Central Province, is stationed at Nawalapitiya, and the Sanitary Officer, Kalutara District, and Southern Province has his headquarters at Kalutara.

Fifty-seven Sanitary Inspectors are stationed in the Western Province, 12 in the Southern Province, 11 in the Central Province, 5 in the Province of Sabaragamuwa, 3 in the Northern Province, and 2 in the Eastern Province. Five of these are serving under Local Boards.

The rat-gang has been working in the following suburbs of Colombo :—Peliyagoda, Wellampitiya, Welikada, Cotta, Nugegoda, Dehiwala, and Oruwala, and in Galle during the outbreak of plague in that town.

6. *Summary of Work.*—During the year 251,840 premises were inspected, of which 42,907 were found insanitary, and were suitably dealt with. 3,017 prosecutions were entered for breaches of sanitary rules and regulations, and 2,716 convictions were obtained. The fines recovered amounted to Rs. 4,840·95. 10,245 notices were served calling upon householders to remedy sanitary defects, in the case of 6,651 of these the requirements were voluntarily complied with, while in the case of the rest persuasion was required.

7. *Buildings.—New and Re-constructed.*—In all 1,936 building applications were dealt with, and plans for 1,082 new buildings were approved of and built, the great majority being in the Western Province.

8. *Infectious Diseases.*—The following infectious diseases were reported, and necessary action taken in regard to prevention by the officers of this Department :—

Enteric fever	..	561	Phthisis	..	..	51
Dysentery	..	748	Smallpox	..	..	14
Chickenpox	..	1,379	Diarrhœa	..	..	33
Measles	..	230	Mumps	..	..	13
Plague	..	10	Diphtheria	..	..	3

9. During the year under review two serious outbreaks of infectious disease occurred. One of smallpox at Kalmunai, in the Eastern Province, and one of plague within the Municipality of Galle. The smallpox outbreak at Kalmunai was discovered on July 21, but there is evidence to prove that it had been in existence for about 4 or 5 weeks prior to that date. In Kalmunai the portion known as Kalmunai-kuddy occupied by the Moors was the portion involved. From this place it spread to the adjoining villages of Saindamarathivu and Karathivu. Several other villages in the neighbourhood were involved later. The total population in these areas was 31,776, the total number of cases diagnosed was 229 with 23 deaths (mortality 10·43 per cent.) The preventive measures taken consisted of proclamation of the area, notification, isolation of patients, quarantining of contacts, disinfection, and vaccination.

The total number of contacts who passed through the camp was 492; 18 of the contacts developed smallpox. Contacts were quarantined for 16 clear days.

*Vaccination.*—Eight vaccinators, including 2 female vaccinators, worked in the area. The total number of vaccinations done was 54,742. The outbreak which lasted till September 24 was in charge of Dr. S. F. Chellappah, Sanitary Officer, Central Province, assisted by Dr. F. N. Jayawardane, 12 Sanitary Inspectors, and 4 disinfecting orderlies.

10. *Outbreak of Plague at Galle.*—Plague was reported at Galle on September 4 and continued till October 15, when the last case occurred. The control of the outbreak was handed over to the Sanitary Branch by the Galle Municipality. The work was in charge of the Assistant Sanitary Commissioner, assisted by the Sanitary Officer, Central Province, 7 Sanitary Inspectors, and the rat-gang.

In all 16 cases of human plague occurred with 13 deaths, and 26 infected rats were found.

The preventive measures adopted consisted in strict search for cases, immediate isolation of patients, segregation of contacts, evacuation of infected areas, rat destruction, control of sale of rice, and of movements of residents in the infected area. The total number of persons segregated and kept under observation was 570. The total number of rats destroyed was 2,304. This includes 119 rats found dead, probably of plague, the majority of them were unfit for examination being highly decomposed or mummified.







Permanent anti-plague measures and schemes for the permanent improvement of the evacuated areas were recommended and are being carried out.

11. Smallpox was reported at Rambukkana on December 15. By the end of the month 6 cases had occurred with one death. The Sanitary Officer, Central Province, with the Supervising Sanitary Inspector (Central Province), and 3 Sanitary Inspectors was in charge of preventive measures.

There was no outbreak of enteric fever either in the Hikkaduwa-Dodanduwa area or in Mount Lavinia, though sporadic cases were reported from them and elsewhere; the total incidence of the disease, however, was less than in the previous year, sporadic cases of influenza of a mild type occurred in different parts of the Island.

12. *Sanitary Conveniences: Public Latrines.*—During the financial year 1921-22 thirty-three public latrines were constructed by Local Boards and Sanitary Boards throughout the Island as follows:—

Central Province	..	8	North-Western Province	..	4
North-Central Province	..	5	Northern Province	..	3
Southern Province	..	5	Province of Uva	..	3
Western Province	..	4	Province of Sabaragamuwa	..	1

A sum of Rs. 30,000 has been contributed by Government towards the cost of the above.

*Private Latrines.*—The following is a list of private latrines installed during the year:—

		Pit Latrines.		Dry-earth Latrines.
Western Province	..	14,069	..	776
Central Province	..	946	..	27
Southern Province	..	4,478	..	41
Province of Sabaragamuwa	..	33	..	26
Eastern Province	..	—	..	40
Northern Province	..	—	..	39
		<hr/> 19,526		<hr/> 949

13. *Disposal of Human Excreta.*—In most Local Board towns and some Sanitary Board towns the dry-earth system of conservancy with trenching of burial of night-soil is in force.

In the case of Sanitary Board towns of Colombo District the dry-earth system is being gradually introduced by proclamation of the most congested areas as "Dry-earth Conservancy Areas," and enforcing the conversion of existing pit latrines into dry-earth latrines.

In some Sanitary Board towns of Colombo District day conservancy was introduced as an experiment, and has so far proved to be a success. The selection of suitable sites for trenching of night-soil requires great care, and it is recommended that in every instance expert advice be sought.

14. *Domestic Water Supplies.*—During the year 28,253 wells were inspected, and of these 1,745 were found to be unprotected from pollution, 547 wells were improved.

Forty-three samples of water were examined chemically by the Government Analyst, and 3 samples were examined bacteriologically by the Director, Bacteriological Institute, at the request of the Sanitary Branch. Twenty-two of the samples examined were found unfit, and suitable action has been taken to improve the source of supply.

15. *Scavenging.*—Scavenging of public and domestic refuse was carried out in the various Local Board and Sanitary Board towns throughout the Island. In many of these towns scavenging is carried out by contractors, and in some the work is not done satisfactorily owing to lack of supervision by contractors. At present the refuse is merely dumped on some low-lying land or used to manure grass-fields, with the result that breeding of flies is encouraged and rats are attracted to the dumps. Disposal by incineration is the most sanitary method, and has been adopted in some of the Sanitary Board towns of the Central Province. The adoption of incineration is recommended for all Local Board and Sanitary Board towns.

16. *Licensed Trades.*—The enforcing of regulations relating to the licensing of trades was carried out, and existing conditions are being gradually improved. Much has still to be done, particularly outside the Western Province, which is far in advance of other Provinces in regard to the control and supervision of licensed premises.

Even in the Western Province, however, there is considerable room for improvement; and steps should be taken to withhold licences, where such are not recommended by Sanitary Officers. The following is a tabular statement of applications for licenses dealt with by Sanitary Inspectors in Western, Southern, Central, Eastern, Sabaragamuwa, and Northern Provinces:—

Name of Trade.	Number of Applications.		
	Received.	Recommended.	Not Recommended.
Bakeries	333	306	27
Tea and coffee boutiques	603	564	39
Eating-houses	139	125	14
Public galas	40	38	2
Manure stores	23	23	—
Soap manufactory	1	1	—
Hide stores	2	2	—
Lime kilns	18	16	2
Brick kilns	11	11	—
Dairies	32	29	3
Cabook quarries	7	7	—
Plumbago sheds	3	3	—
Metal quarries	3	3	—
Public bathing places	7	7	—
Kraals for soaking coconut husks	7	7	—
Fibre dyeing	2	2	—
Butcher stalls	75	73	2
Fish stalls	23	22	1
Pork stalls	1	1	—
Fibre mills	7	7	—
Desiccating mills	5	4	1
Aerated water manufactories	4	4	—





17. *Milk Supply*.—Sixty-six samples of milk have been analyzed by the Government Analyst at the request of this Department. Of these, 49 were found adulterated and 17 were found to be genuine milk. Offenders within Sanitary and Local Board limits were prosecuted and punished.

The Colombo Suburban Dairies and Laundries Ordinance, 1908, was amended by Ordinance No. 7 of 1922, and its provisions made applicable to Local Board and Sanitary Board towns. This is a valuable enactment, and gives local authorities the necessary power to control laundries and dairies catering for the town in their charge.

18. *Town Planning and Improvement*.—In addition to his routine duties the Sanitary Engineer carried out the following works for the Sanitary Board, Colombo District :—

Cadastral (detail) survey of about 550 acres in the Sanitary Board of Cotta.

Road Trace : Levels and cross sections and survey were made, and estimate framed for a cart road 45 feet wide from the Pita Cotta market junction to Nugegoda, a distance of 1 mile through the village of Pagoda.

Levels were taken at Nugegoda and Henaratgoda in connection with new roads.

Type plans were prepared for the Department for a faeces incinerator and a urinal.

19. *Education*.—Public lantern lectures on sanitation were delivered at Cotta and at Kurunegala by the Sanitary Commissioner, and four lectures in Sinhalese were delivered by the Sanitary Superintendent.

The Sanitary Branch took part in the following exhibitions :—All-Ceylon Industries Exhibition, Jaffna Agricultural and Industrial Exhibition, and the Agricultural Shows held at Alutgama, Hikkaduwa, and Panadure. The Sanitary section of the All-Ceylon Industrial Exhibition was organized by the Sanitary Department under the direct supervision of the Sanitary Commissioner. The exhibits consisted of models of sanitary appliances, &c., posters, diagrams, &c., conveying sanitary information. There were also exhibits from the Bacteriological Institute, the Malariologist, and the Government Analyst, in charge of officers of the respective departments. The exhibits were described to visitors by the officers in charge. Leaflets in English and in the vernaculars on the causation and prevention of diseases commonly prevalent in Ceylon were distributed. The sanitary section of the various exhibitions and shows attracted the attention of many visitors, who were greatly interested in the exhibits. A complete set of local lantern slides, models, and posters in the vernaculars on sanitary subjects would be of great educational value. Sanitary propaganda is essential if the intelligent co-operation of the people in sanitary work is to be secured, and without such co-operation no permanent sanitary progress could be attained. Measures for the education of the public in sanitation should therefore be organized, and should be carried out systematically throughout the Island.

20. *Anchylostomiasis Campaign Area*.—The work in the triangular area having been practically completed, the Director controlling the campaign extended the area from Henaratgoda to Mirigama in March. This new area consists of 101 villages, and 12 Sanitary Inspectors of the old area had to be transferred to the new. For the purpose of supervising the completed areas both with regard to sanitation and the maintenance of latrines in good order a course of training in elementary sanitation was started for police headmen in the triangular area in October, 1921, and was continued till April of the year under review. At the termination of the course 48 candidates were examined, of whom 35 were successful.

The distribution of certificates to the successful candidates by the Government Agent, Western Province, took place on November 29, which was followed by a lantern lecture in Sinhalese by the Sanitary Superintendent. Amongst others the following were also present :—The Sanitary Commissioner; the Assistant Government Agent, Western Province; the Director, Anchylostomiasis Campaign; the Sanitary Officer, Colombo District.

For the new area another training class for headmen was started in May. Of the 42 candidates 33 were successful in the examination which was held in December. Certificates and rewards to the successful candidates will be awarded by the Government Agent, Western Province, in due course.

21. *Railway Sanitation*.—Staff consisted of a Sanitary Officer and six Sanitary Inspectors doing general sanitary work, and one Sanitary Inspector doing minor anti-malarial work at the malarial stations.

The following is a summary of work done during the year :—

2,194 defective conditions were found in latrines, of which 1,908 were attended to.  
1,101 mosquito-breeding places were discovered, of which 952 were dealt with.  
In 375 cases the water supply was found to be defective, of which 112 were attended to.  
In 378 cases the conservancy was at fault, of which 353 were attended to.  
In 920 cases the scavenging was found to be defective, of which 771 were dealt with.  
In 2,045 cases the drainage was found to be defective, of which 1,633 were dealt with.  
1,926 premises were found insanitary, of which 1,783 were improved.

The following infectious diseases were reported and the necessary action taken :—

Plague ..	..	1	Chickenpox ..	..	7
Enteric ..	..	6	Measles ..	..	3

22. Altogether 390 reports on various defective conditions, which could not be attended to by the Inspectors, were sent in, and action on these was taken where necessary. During the year Rs. 7,350 have been spent from the new works vote on various improvements. These included improvements to wells and new wells (17), new drains and improvements to drains (3), improvements to latrines (7), new catchpits (2), and a water tight pit for the latrines at Dematagoda. The sanitary conditions at Mount Mary bungalows area, the Dematagoda lines, Nawalapitiya, Nanu-oya, and Anuradhapura, where the gangs of coolies are working under our Inspectors, have been satisfactorily maintained throughout the year.

*Quinine Distribution*.—As a result of the correspondence on the matter of the distribution of quinine at malarial stations, it has been decided to issue a form to the malarial stations, to be kept by the Station Masters, showing the stock and the distribution of quinine at these stations. It has also been decided to send an apothecary to Anuradhapura, who will be responsible for the issue of quinine for curative and prophylactic purposes at this station, and who, at the same time, could attend to minor ailments and injuries. The apothecary assumed work towards the end of December. The question of conservancy and scavenging at Nanu-oya, which at the beginning of the year was not being satisfactorily done, was taken up with the Chairman, Sanitary Board, Nuwara Eliya District. The scavenging has been taken up by the Board since August, and the conservancy will also be taken up by the Board as soon as the Board is able to get ready a suitable trenching ground.







23. *Summary of Minor Anti-Malarial Work done at Stations.*—Sanitary Inspector, W. Victor Fernando, with a gang of coolies, continued during the year the measures which were started in March, 1921. The number of coolies working was increased during the year from 6 to 11. The nature of the work done consisted as before of—

- (a) Searching for mosquito breeding places and dealing with them ;
- (b) Abolition of breeding places ;
- (c) Providing new drainage ;
- (d) Grading, weeding, and cleaning existing drains ;
- (e) Removal of low shrub and jungle ;
- (f) Oiling pools ; and
- (g) Attending to general sanitation.

The following is a summary of the actual work done :—

Number of burrow pits filled up	..	..	92
Cubical contents of same	..	..	1,311,722 cubic feet
Cubical contents of cleaned up existing earth drains	..	..	25,775 do.
Cubical contents of new earth drains cut	..	..	18,962 do.
Cubical contents of cleaned up existing built drains	..	..	45 do.
Number of pits dug to bury rubbish	..	..	22
Cubical contents of same	..	..	2,478 cubic foot
Extent of jungle and low shrub cleared	..	..	3,216,439 square foot
Extent of thick jungle cleared	..	..	863,425 square foot
Number of palmyra trees cleaned up	..	..	122
Number of wells cleaned up	..	..	2
Number of pits oiled	..	..	15
Approximate extent of same	..	..	7,027 cubic foot
Amount of oil used	..	..	33 gallons 2 bottles

24. *Sanitation in the Central Province.*—The sanitary staff in this Province consists of the Sanitary Officer, with headquarters at Nawalapitiya, and attached to his office are the Supervising Sanitary Inspector and a clerk. There are 11 Inspectors working in the Province. Dr. S. F. Chellappah, the Sanitary Officer, was away from his station on epidemic duty at Kalmunai and at Galle for nearly five months of the year from about the end of July.

In consequence of this the work of the Province was to some extent neglected though the Supervising Sanitary Inspector carried out some of the routine inspections.

There has been a steady improvement in the sanitation of the towns in the Province, thanks mainly to the persistence of the Sanitary Officer in pointing out sanitary defects and indicating remedial measures. Two towns, viz., Nawalapitiya and Dambulla, extended their limits, and Aluvihare was brought under the operation of the Small Towns Sanitary Ordinance.

25. *Water Supply.*—Various minor improvements in the water supply have been carried out during the year, but the larger towns continue to suffer from an insufficient supply. This is a serious sanitary defect and should receive the early attention of the local authorities.

In some of the smaller towns the source of water supply is liable to pollution, steps should be taken to protect such sources of supply.

26. *Scavenging and Disposal of Refuse.*—There has been some improvement in scavenging. Eighteen small towns are now provided with incinerators for the disposal of refuse. Incinerators have been recommended for other towns too. In this respect the Central Province is in advance of the Western, where tipping is still the method of disposal of refuse.

27. *Conservancy and Disposal of Excreta.*—In Kandy District the dry-earth system is in force in all the towns, except three. In Matale District only the public latrines have buckets, the majority of private latrines being pits. During the year under review 49 public latrine seats and 145 private seats were provided in Board towns, bringing the total number of seats to 2,164. There are still some small towns without public latrines, and in several others additional public latrine accommodation is required.

28. *Drainage.*—Extensions to existing front drains were carried out at Matale, Nawalapitiya, Hatton, and Teldeniya. Extensions to street drains are required in all the Local Board towns and in many of the Sanitary Board towns.

Back Drainage : the majority of towns continue to be without adequate back drainage, but varying length of back drains were provided in the case of 8 Sanitary Board towns.

29. *Licensed Trades.*—Some improvements were effected during the year, chiefly in the case of bakeries. Galas and cattle sheds require improvement in most towns, particularly in regard to prompt removal of dung and waste straw from their vicinity.

It is hoped to improve the sanitary condition of dairies in the outskirts of Local Board and Sanitary Board towns, as the provision of the Suburban Dairies and Laundries Ordinance of 1908 were made applicable to all Sanitary Board towns by Ordinance No. 7 of 1922.

*Public Markets.*—The provision of markets or even sanitary stalls for the sale of meat and fish is an urgent necessity in many of the Sanitary Board towns.

30. *Infectious Diseases.*—The only source of information available to the Sanitary Officer are the reports of the Sanitary Inspectors of the Department forwarded to him when cases of infectious disease are brought to their notice. With the exception of 5 cases of smallpox, which occurred at Kotagala in March and April, there have been no serious outbreaks of infectious disease in the Central Province. A rat-proof granary has been built at Matale, and the erection of similar grain stores in several other towns is under consideration.

31. *Buildings and the Housing Ordinance.*—Building applications are submitted to the Sanitary Officer for report by the Local Boards of Nawalapitiya, Campola, and Hatton, and by the Sanitary Boards of Kandy and Matale Districts. All applications from Nuwara Eliya District are, however, not submitted to him, some being dealt with directly by the Chairman. This practice cannot be regarded as conducive to sanitary progress, as it is an obvious advantage to have building applications scrutinized and reported on by an expert officer, one of whose important duties is to see that the requirements of the housing ordinance are complied with.





32. *General Remarks.*—It has been pointed out on previous occasions and must here again be stressed that the work of the Sanitary Department and its officers is, and will continue to be, seriously hampered until they are given a definite legal status.

The inauguration of District Councils during the year under review has created another local body, whose relation to the Sanitary Department and its officers has not yet been made the subject of consideration. The need for revision and codification of the sanitary law has long been felt, and one is glad to note that action is now being taken in that direction.

The need for an extension of the influence of the Department to those Provinces not yet provided with Sanitary Officers is an outstanding one. It is very gratifying to be able to state that in reviewing the past year there is no doubt that interest in sanitation is undoubtedly being awakened. The evidence that this is so has been manifested in many ways. It is indeed a happy augury for the future that suggestions for the improvement of the public health have been to the forefront in the deliberations of the newly formed District Councils, and have met with their warm approval. Efforts in the direction of social uplifting cannot be dissociated from those aiming at an improved sanitary environment.

J. F. E. BRIDGER,  
Sanitary Commissioner.

SECTION V.—GENERAL.

26. *Hospitals, Asylums, and Dispensaries.*—In 1922 there were 81 Government general hospitals, providing a total accommodation of 7,165 beds and varying in size from 16 beds in a few outstations to 800 beds in the General Hospital, Colombo. There were in addition a number of special hospitals in or near Colombo, viz., a lying-in home with 100 beds, an eye hospital with 60 beds, a women's hospital of 34 beds, a children's hospital of 50 beds, a female venereal hospital of 24 beds, a police hospital of 34 beds, a tuberculosis hospital for chronic cases of 258 beds, a tuberculosis sanatorium of 54 beds, and an infectious diseases hospital of 16 beds. In addition, there is a Lunatic Asylum in Colombo with 1,200 beds, and a temporary asylum at Matara, Southern Province, with 150 beds; a Leper Asylum at Hendala with 450 beds; and another Leper Asylum at Mantivu, Eastern Province, with 150 beds.

During the year no fewer than 163,365 in-patients were treated in these various institutions. Attached to each hospital is an Out-patient Department. Further, apart from the institutions for in-patients, there are 485 Government dispensaries in different parts of the Island. The total number of out-patients treated was 2,373,206, who paid 3,444,209 visits.

Lastly, there are 67 estate hospitals and over 500 estate dispensaries maintained by the proprietors of estates. The following buildings were completed during the year:—New hospitals at Elpitiya and Udugama; a temporary hospital at Killinochchi; a Leper Asylum at Mantivu; new dispensary buildings at Elkaduwa, Elephant Pass, Ratmale, and Kaltota. Additional wards were built at Deniyaya and Ramboda, as also new quarters for matron and nurse at Ramboda. The hospital at Batticaloa was provided with a new administration block.

The new Seamen's Ward, General Hospital, 2 new wards Kandana Sanitorium, the dispensary at Punakari, an infectious diseases hospital at Neboda commenced in the previous year were still in progress at the end of this year.

27. The following is a summary of the chief features of the report of the Medical Superintendent, General Hospital, Colombo:—

780 patients remained in hospital on December 31, 1921, 46 in the paying section and 734 in the non-paying section.

During the year 16,548 patients were admitted, 15,597 to the non-paying wards and 951 to the paying wards. At the Out-patient Department 23,336 persons were treated, representing 44,767 attendances, i.e., a daily average attendance of 140.

Of the 997 under treatment in the paying section, 902 were discharged, 59 died, and 36 remained on December 31, 1922.

Of the 16,331 under treatment in the non-paying section, 13,854 were discharged, 1,847 died, and 630 remained on December 31, 1922.

The average sick in hospital was 49·6 in the paying section and 764 in the non-paying section.

The maximum and minimum number of patients in hospital on any one day during the year in the paying and non-paying sections respectively was as under:—

Paying Section.					
Maximum	..	..	..	60 on June 22, 1922	
Minimum	..	..	..	33 on April 14, 1922	
Non-paying Section.					
Maximum	..	..	..	822 on March 30, 1922	
Minimum	..	..	..	590 on October 19, 1922	

Of the 15,597 admitted in 1922 to the non-paying section, 7,205 were surgical cases and 8,392 were medical cases.

*Surgical Operations.*—The number of surgical operations performed in 1922 was 2,704, exclusive of 187 minor operations performed in the Out-patient Department. 2,324 operations were performed in the non-paying section, with 148 deaths, giving a percentage mortality of 6·3.

In the paying section the number of operations was 380 with 8 deaths, giving a percentage mortality of 2·1. The following table gives the figures for the past two years of the cases under treatment, the percentage mortality, and the daily average number in hospital in the paying and non-paying sections, respectively:—

	Paying Section.				Non-paying Section.			
	1921.		1922.		1921.		1922.	
Cases under treatment	..	1,007	..	997	..	16,130	..	16,331
Deaths	..	68	..	59	..	1,896	..	1,847
Percentage mortality	..	6·7	..	5·9	..	11·75	..	11·30
Daily average sick	..	51·61	..	49·6	..	801·29	..	764





The figures for 1922 show a slight increase in the number of admissions as compared with 1921. The daily average number of patients in the non-paying section was 100 over the number of available beds, steps are being taken to prevent this overcrowding.

The large number of chronic incurable cases continue to be a problem until such time as a suitable outlet can be found for them. The Victoria Home for Incurables and the Home for the Aged are invariably full.

As regards particular diseases, the following table shows their comparative prevalence and mortality during the past five years as shown by the hospital admissions :—

	1918.		1919.		1920.		1921.		1922.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Anchylostomiasis ..	576 ..	66 ..	655 ..	99 ..	700 ..	111 ..	812 ..	135 ..	585 ..	81
Malaria ..	535 ..	13 ..	849 ..	18 ..	781 ..	11 ..	1,135 ..	20 ..	2,121 ..	37
Appendicitis ..	110 ..	6 ..	170 ..	3 ..	178 ..	3 ..	203 ..	3 ..	167 ..	5
Parangi ..	109 ..	— ..	128 ..	— ..	102 ..	1 ..	274 ..	1 ..	306 ..	4
Dysentery ..	138 ..	29 ..	286 ..	56 ..	272 ..	73 ..	395 ..	78 ..	262 ..	69
Pneumonia ..	1,176 ..	389 ..	605 ..	365 ..	532 ..	274 ..	470 ..	235 ..	685 ..	364
Enteric fever ..	163 ..	53 ..	238 ..	126 ..	319 ..	129 ..	316 ..	102 ..	297 ..	95
Pulmonary tubercu- losis ..	569 ..	207 ..	546 ..	282 ..	602 ..	294 ..	765 ..	346 ..	527 ..	232

Malaria shows a very large increase, the number of admissions having increased four-fold since 1918, and being nearly 1,000 over last year. These figures are worthy of consideration, as Colombo has previously been very free of the disease.

Parangi and pneumonia show an increase, while dysentery, enteric fever, and pulmonary tuberculosis, it is pleasing to record, show a decrease.

*X-Ray Department.*—Seventy-three private and 515 hospital patients attended this department. The fees accruing to Government for the private patients amounted to Rs. 1,230.

*New Seamen's Memorial Ward.*—This ward, which was commenced in October, 1921, is nearing completion, and will be ready for occupation by about September, 1923.

*Venereal Clinique at the General Hospital.*—This department, opened under the supervision of Dr. R. L. Spittel in August, 1921, has continued its work during 1922 very satisfactorily. From January, 1923, Dr. E. C. Alles takes charge of the clinique.

The return of cases treated during 1922 is as follows :—

*Syphilis.*

1. Number of cases	Primary ..	..	..	109
	Secondary ..	..	..	369
	Tertiary ..	..	..	34
	Total ..	..	..	512
2. Number of injections of Neo-Salvarsan ..				1,078
				Cases.
Chancroids ..	..	..	..	182
Gonorrhœa ..	..	..	..	318
Parangi ..	..	..	..	92

The clinique, though it is still by no means as popular as it deserves to be, fulfils a great need to the public and largely relieves overcrowding in the lower surgical wards of the hospital. Minor operations are done there as a routine under local anæsthesia ; and all cases of syphilis and gonorrhœa are now treated as out-patients except, (a) destitute cases coming from long distances, and (b) those with complications that require indoor treatment.

The clinique is now well equipped and staffed ; and the work done there is thoroughly up to date, microscopic and serological tests are done as a routine, and careful records kept of all cases ; printed forms explaining the nature of gonorrhœa and syphilis are distributed to the patients. The Medical Officer in charge, having a certain number of beds in the lower ulcer ward, has the opportunity to take in and treat venereal cases requiring special treatment, e.g., nerve syphilis, and the out and indoor departments thus work as a signal unit. Venereal cases, discharged from the wards after treatment, are given cards in which the diagnosis and the treatment already given are entered ; this is presented at the outdoor clinique and continuity of treatment thus ensured.

It is disappointing to have to confess that there is great difficulty in convincing the people of this country, like most others of the necessity of continuance of treatment. No sooner are their symptoms relieved than they cease to attend until perhaps a recrudescence occurs, nor does this teach them the necessary lesson. Thus, while few cases of syphilis continue treatment to a finish, few or no cases of gonorrhœa come for treatment in these later stages which test the mettle of the specialist and foster in him that skill in the use of special instruments so necessary for the complete cure of gonorrhœa.

*Staff.*—It is with deep regret that I have to record the untimely death of Dr. Alan Kidd, under sad and painful circumstances, which occurred on August 27, 1922. Dr. Kidd had been Superintendent of the hospital from June 11, 1921. Dr. Grenier acted till September 18, and Dr. Parsons from that date until December 22, when Dr. V. van Langenberg was appointed to the vacant post.

*Expenditure and Receipts.*—The receipts during the last financial year from patients in the paying section amounted to Rs. 107,918·90, and in the non-paying section to Rs. 3,618·50.

The approximate expenditure during the same period was Rs. 54,790·01 in the paying section, and Rs. 185,717·53 in the non-paying section.

The expenditure in both sections does not include the salaries of the medical and nursing staff, nor the cost of drugs and dressings, nor the maintenance of the buildings.





28. *The Lunatic Asylum, Colombo.*—Shortage of accommodation is still a marked feature and so is the lack of suitable accommodation for better class patients. Great improvements in these respects are anticipated when the new asylum now being built at Angoda, a few miles outside Colombo, is completed.

On January 1, 1922, there were 604 male and 420 female patients in the Asylum, an increase for the twelve months of 54 male and 27 female patients.

During the year 264 men and 165 women were admitted, a very considerable increase over the number admitted in 1921.

The total number of patients treated during the year was 1,443, of which 868 were men and 575 were women.

During the year 192 men and 64 women were discharged from the Asylum.

Sixty-three male patients were transferred to Matara Asylum in 1922.

Ninety patients died in the Asylum during 1922, 41 of these were men and 49 were women.

The average number of patients each day in the Asylum was 1,046. Last year the average number was 976.

There were 38 persons in the House of Observation at the beginning of the year, and during the year 432 persons were admitted for observation, and of these, 231 were transferred to the Asylum and 161 were discharged. Thirteen patients died and 65 remained in on December 31, 1922.

The daily average was 49.54 patients. Thus the daily average grand total for the House of Observation and the Asylum was 1,095.54.

29. *The Infectious Diseases Hospital, Colombo.*—As is customary, cases were admitted to this hospital from Colombo and its environs and also from ships arriving at the port. On December 31, 1921, there were 12 cases remaining, during the year 792 cases were admitted, making a total of 809 under treatment. The number of cases of smallpox admitted during the year was 37; of these, 13 were imported cases and 24 local cases. Of the local cases 9 were confluent, 8 were modified, and 7 discrete; of the imported cases 4 were confluent, 3 modified, and 6 discrete. Six cases proved fatal. Sixteen of the cases had marks of former vaccination, but the rest had no marks at all, and one was definitely known not to have been vaccinated. The Medical Officer in charge reports that he found the use of a 5 per cent. solution of potassium permanganate freshly prepared to be very efficacious in preventing septic trouble. Amongst the local cases were 3 females from the Lunatic Asylum—the source of infection in these cases was not discovered—two golf caddies attached to the adjoining links were also infected with the disease, probably from surreptitious visits to the hospital premises. Fifty-three plague cases were admitted (out of the 136 cases that occurred in the town), and 1 remained on December 31, 1921; of these 54 cases, 43 died, 5 remained on December 31, 1922, and 6 recovered. No plague cases from ships were landed during the year. As regards the type of disease 4 were septicæmic and the rest bubonic; of the bubonic cases 29 had buboes in the groin, 8 buboes in the axilla, and 6 had cervical buboes. No cases of cholera, and only three cases of diphtheria were admitted, of which 1 died. No fewer than 498 cases of chickenpox were admitted, and one of these, a debilitated child, died. Fifty-three cases of measles, all of whom recovered, were also admitted, so also were 6 cases of whooping cough, one of which proved fatal.

30. *Victoria Memorial Eye Hospital (60 beds).*—The number of admissions was 1,460, as against 1,157 in 1921 and 1,041 in 1920, so that overcrowding of the wards was even more prevalent than in previous years and showing that increased accommodation is a real necessity. The total number of out-patients (first visits) was: 15,816 eye cases and 3,115 ear, nose, and throat cases, as against 13,168 eye cases and 2,966 ear, nose, and throat cases in 1921. No fewer than 703 operations on in-patients and 1,389 minor operations on out-patients were performed. There is an eye department attached to the General Hospital at Galle and to the General Hospital at Kandy. At Galle 530 cases were treated as in-patients and 2,545 as out-patients. At Kandy 520 cases were treated as in-patients and 3,195 cases as out-patients.

31. *The Convict Hospitals* comprise the Borella Convict Hospital (218 beds), Mahara Jail Hospital (50 beds), and the Welikada Female Jail Hospital (8 beds). In addition, there are 16 other jail hospitals attached to outstation prisons. The daily average sick in the Borella Convict Hospital was 113.26, as against 55.46 in 1921 and 86.76 in 1920. The total number of cases treated was 3,158, as against 1,720 in 1921, and the mortality was 1.20 per cent., as against 3.6 per cent. in 1921. At Welikada there were 88 cases with no deaths. At Mahara the average daily sick was 94.84, the number of admissions was 5,767, of which no fewer than 3,377 were for malaria. The prevalence, at Mahara, of malaria formed the subject of an inquiry, and energetic steps were taken in the latter half of the year to deal with this scourge. The matter is referred to in the report of the Malariologist. The deaths at Mahara were 35. The average number of prisoners was 796.

32. *The Police Hospital, Borella.*—The number of patients treated was 1,153, as against 1,039 in 1921; of these, 254 were for malaria, chiefly relapses in police who had been transferred to Colombo from various malarious stations. Some 246 cases of influenza of a mild type were also admitted. At the out-patient department of this hospital and at the branch police dispensaries in the towns 4,374 cases of minor ailments were attended to.

33. *The De Soysa Lying-in Home (100 Beds).*—The number of cases under treatment was 3,002, as against 3,506 in 1921 and 2,556 in 1920. The death-rate was 2.5 per cent., as against 2.29 in 1921. Of the 78 deaths, 32 were due to the accidents of child birth and puerperal causes, the other deaths being due to intercurrent causes, such as anchylostomiasis and pneumonia, &c. The number of births was 2,284: of these, 1,874 children left the hospital alive and well—299 were still born and 139 died soon after delivery—39 pairs of twins and 1 set of triplets were born. The obstetric operations amounted to 228, including the use of forceps in 80 cases. Labour was classified as normal in 2,180 cases (occipito anterior 2,025, occipito posterior 155). Face presentations were 12, brow 1, pelvic 123, transverse 21.







As regards diseases of pregnancy, pre-eclampsia toxæmia was recognized in 126 cases, and eclampsia occurred in 33 cases. There were 20 cases of placenta previa, of which 4 proved fatal. Of the eclampsia cases, 1 proved fatal.

Fifty-five pupil midwives were admitted for training during the year, and 52 qualified by passing the necessary examination.

34. *The Lady Havelock Hospital for Women (40 beds) and the Lady Ridgeway Hospital for Children (50 beds)* are located in the same grounds, and are under the charge of the same Medical Officer, Miss Dr. Anderson. The total number of cases under treatment was 2,415, and the daily average sick was 92.96, as against 2,287 and 88.61 in 1921. The children's hospital is always overcrowded, and many more seek admission than can be accommodated. The number of surgical operations performed during the year was 723, and of these, 518 were classed as major operations, as against a total of 512 and 314 major in 1921. A very large proportion of children are admitted in a hopeless condition, suffering from improper feeding, actual starvation, and congenital syphilis, and many die within 24 hours of admission. The death-rate 18.5 is, therefore, unduly high. Children are treated as a routine measure for worms from which they all suffer. Nineteen pupil nurses were admitted for training and nineteen went up for their examination at the end of their second year, and of these, 17 passed. The total nursing staff now consists of 1 European Matron, 2 European Sisters, 8 Ceylonese Charge Nurses, and 22 Pupil Nurses.

35. *The Victoria Home for Incurables*.—Eighty-three patients remained on December 31, 1921, and 24 were admitted, making a total of 107 under treatment. Of these, 16 died, 18 were discharged, and 73 remained at the end of the year.

36. *Bacteriological Institute*.—The following is the report of the Director (Dr. Lucius Nicholls):—

(a) *Routine Examinations*.—The total number of specimens examined bacteriologically was 10,571. A statement showing the number of specimens examined and vaccine prepared is attached.

(b) *Bacteriological Fees*.—The income of the Bacteriological Institute from fees received amounted to Rs. 5,442.50.

(c) The number of patients treated at the Pasteur Institute during the year was 207.

(d) *Pasteur Institute Fees*.—The income of the Pasteur Institute from fees received from well-to-do and estate patients, who underwent treatment at the Institute during the year, was Rs. 1,016.35.

(e) The number of dog's brain, &c., examined for rabies was 68. A statement showing the number of material examined for rabies, with their results and the respective stations from where they were received, is attached.

#### Annual Return of Specimens Examined and Vaccine prepared during the Year 1922.

Specimens.	Official.	Private.	Total.	Positive.	Negative.
Blood for typhoid ..	1,217	36	1,253	427	826
Blood for para-typhoid A*	499	17	516	14	502
Blood for para-typhoid B*	499	17	516	—	516
Blood for Wassermann test	1,158	200	1,358	720	638
Blood for malaria ..	24	33	57	11	46
Blood for malaria militensis	1	—	1	—	1
Blood culture for examination	—	1	1	—	—
Bull for rabies ..	1	—	1	—	1
Dog for rabies ..	67	—	67	34	21
Fæces for amoebæ ..	2	7	9	—	3
Fæces for anchylostomiasis	4	3	7	3	4
Fæces for other intestinal parasites	3	8	11	1	—
Fæces for microscopical examination	—	1	1	—	—
Fæces for typhoid ..	3	1	4	1	3
Evacuation for cholera vibrio	14	—	14	—	11
Secretions for gonococci	61	4	65	9	56
Secretions for B. diphtheriæ	13	9	22	7	15
Secretions for leprosy	20	1	21	5	13
Human material for B. pestis	83	—	83	28	55
Rats for B. pestis ..	5,511	—	5,511	19	5,492
Sputum for tubercle bacilli	126	30	156	38	118
Sputum for pneumococci	8	—	8	5	3
Cerebro-spinal fluid for T. B.	1	—	1	—	1
Milk for tubercle bacilli	—	1	1	—	1
Urine for tubercle bacilli	1	—	1	—	1
Scrapings for spirochaetes	2	4	6	1	5
Tumor for examination	3	1	4	—	—
Urine for bacteriological examination	8	6	14	—	—
Urine for chemical examination	22	10	32	—	—
Urine for microscopical examination	—	7	7	—	—
Miscellaneous specimens for examination	57	1	58	—	—
Water for examination	12	12	24	—	—
Anti-typhoid vaccine (doses)	4	97	101	—	—
Anti-plague vaccine (doses)	—	11	11	—	—
Gonococcal vaccine (doses)	399	37	436	—	—
Staphylococcal vaccine (doses)	20	20	40	—	—
Mixed vaccine (doses)	10	19	29	—	—
Tuberculin (doses) ..	102	—	102	—	—
Auto-vaccine ..	4	18	22	—	—
Total	9,959	612	10,571	—	—

\* It is interesting to note that out of 516 para-typhoid A only 14 were positive, and out of 516 para-typhoid B all were negative.





## Annual Return of cases of Rabies examined during the Year 1922.

Received from.	Result.		Unfit for Examination.	Total.
	Positive.	Negative.		
Colombo ..	16	13	2	31
Nuwara Eliya ..	4	3	3	10
Ratnapura ..	3	—	1	4
Kalutara ..	1	1	2	4
Galle ..	3	—	1	4
Kegalla ..	2	1	—	3
Kurunegala ..	—	2	1	3
Jaffna ..	—	—	2	2
Kandy ..	2	—	—	2
Matara ..	—	1	—	1
Matale ..	1	—	—	1
Anuradhapura ..	1	—	—	1
Badulla ..	—	1	—	1
Chilaw ..	1	—	—	1
Total ..	34	22	12	68

37. *The Ceylon Medical College.*—The following table gives particulars *re* the number of students of the College :—

Number of Medical Students on December 31, 1921 ..	219
Number of Apothecary Students on December 31, 1921 ..	47
Number of Medical Students who joined the College in 1922 ..	35
Number of Apothecary Students who joined the College in 1922 ..	28
Number of Medical Students who passed out in 1922 ..	20
Number of Apothecary Students who passed out in 1922 ..	17
Number of Medical Students who left the College in 1922 ..	4
Number of Apothecary Students who left the College in 1922 ..	7

During the year the medical students received their training in Chemistry, Physics, and Biology at the University College. In consequence of changes made in the curriculum for the education of medical students by the Medical Council in England, no medical student can be registered as such after January 1, 1923, until, apart from a preliminary examination in general knowledge, he has also passed a pre-registration examination in Physics and Chemistry. Arrangements are being made with the University College authorities to conduct such pre-registration examination. After passing such examination and becoming registered as a medical student the course of study will now extend over five years. The effect of these new regulations will be to prevent the enrolment of any medical students at the Medical College during 1923, and it is proposed to abolish the entrance examination of the Medical College, and to admit students to the College on the results of the pre-registration examination held by the University College. Apothecary students will, in future, be required to sign a bond that if required they will agree to serve for three years as estate dispensers after passing the necessary examinations.

The revenue of the College for the financial year October 1, 1921, to September 30, 1922, was Rs. 43,121, and the expenditure for the same period was Rs. 61,489.70. The question of raising the fees from an average of Rs. 300 a year to Rs. 450 a year is now under consideration.

The rebuilding of the College is an urgent necessity.

38. *The Civil Medical Stores.*—During the year there was no difficulty experienced in getting supplies at regular intervals, but further accommodation is urgently needed. The cost of drugs and instruments, &c., purchased was Rs. 858,432. A sum of Rs. 8,803 was realized by the sale of drugs to estates. Drugs to the value of Rs. 22,286 were supplied free to various other Government departments. Issues of quinine to the amount of 155,580 ounces of the value of Rs. 427,856 were made. Opium and its preparations to the value of Rs. 285,645 were received, and the amount realized from the sale of opium was Rs. 574,006.52.

## SECTION VI.—MEDICAL AID TO IMMIGRANT COOLIES.

39. The number of immigrants to Ceylon who passed through the Mandapam Depot was 125,846, of whom 78,106 were estate labourers. The number of estate labourers passed through in 1921 was 25,344 and in 1920 was 45,912. Of the miscellaneous passengers (47,740), some 13,309 were detained in quarantine for the full period, but the others who were able to give definite and easily traceable addresses were permitted to report themselves after arrival in Ceylon.

The buildings in the camp were maintained in excellent order. An ample supply of good drinking water was provided during the year. Sea water is now used for flushing W. C.'s, and the effluent is delivered well out to sea by the use of an electric pump. The sanitary condition of the camp has been maintained in good order with the help of a Sanitary Inspector and two Sanitary Overseers. The dieting has been very satisfactorily carried out by Messrs. Spencer & Co. The rainfall for the year was 29.64 inches, as compared with 36.63 in 1921 and 44.47 in 1920. November was the wettest month, and in the last four days of that month the rainfall was nearly 9 inches.

Heavy rainfall in Southern India at that time led to breaching of the railway line and coolie traffic had to be diverted to Tuticorin, and the coolies brought from there by boat to Colombo and segregated at Ragama Camp. During the year 506 cases were either claimed by relatives or were rejected as unfit, and these were sent back to their homes. The crews of 64 steamers passing from Calcutta or Bombay to join ships in Colombo, and numbering 2,887 persons, were vaccinated, and their personal effects disinfected. The health of the camp was good throughout the year. There was no case of plague, one case of cholera occurred and proved fatal, 13 cases of smallpox were detected, of which 11 were amongst estate labourers and 2 amongst passengers; of these, one confluent case died. There were 37 cases of chickenpox. The number of cases admitted to hospital for malaria was 151 and the number treated as out-patients for that disease was 1,057, of whom 438 were members of the staff. As regards vaccination 25,164 passengers were vaccinated, and amongst the estate coolies there were 4,401 primary vaccinations and 62,479 re-vaccinations. The number of deaths in camp was 29. The total number admitted to hospital was 624, of whom 19 died, and the total number of out-patients was 12,896.







At the close of the year Dr. van Langenberg, who had been in charge of the camp since its opening in 1917, was promoted to be Medical Superintendent of the General Hospital, Colombo, a testimony of the excellent work he had carried out at Mandapam. The camp was visited by His Excellency the Governor and by several Ceylon and Indian officials, as well as by several well-known private persons, and, as usual, all expressed themselves as more than satisfied with the construction of the camp and the way in which it was organized and maintained.

40. *Government District Hospitals and Dispensaries in Planting Areas.*—There are 58 such hospitals with accommodation for 4,974 patients, and staffed with medical officers, nurses, and attendants. Apart from the out-patient department attached to each of these hospitals there are 81 outdoor dispensaries not attached to hospitals in these planting areas.

41. *Estate (Rebate) Hospitals.*—There are 67 such hospitals built, staffed and maintained by the proprietors of estates. The sum of Rs. 110,590 was paid by Government as a rebate of export duty (under the provisions of section 27 of Ordinance No. 9 of 1912), on the produce of the estates from October 1, 1921, to September 30, 1922.

42. Free grants of drugs to the value of Rs. 202,765·88 was given to estate hospitals or dispensaries during the year.

43. *Medical Inspection of Estates.*—Three Senior Medical Officers are detailed for this work to bring to the notice of the Department and the proprietors any sanitary defects and deficiencies and the necessary action to remedy these is urged on those responsible. Sanitary progress on rubber estates was hindered by the depression in the prices of that product. It is satisfactory to note that the free dieting of infants and young children is becoming more general, and an increased number of crèches are being provided and so also are an increased number of trained midwives. The introduction of special legislation regarding immigrant coolies by the Indian Government will compel further attention to the housing and medical care of such labourers, and though estate proprietors may be put to additional expense, it is believed that they will be amply repaid by the improved health and contentment of their labourers.

44. *School Medical Inspection.*—Dr. H. E. Ekanayaka, Medical Inspector of Schools, reports that during the first term of the year routine inspection of the English schools in the Western Province, including the large colleges, was carried out. In rural schools he finds the most prevalent disabling influence amongst the children is their infection with hookworm, and he has urged upon the school authorities the need for treatment and the spread of knowledge as regards prevention. Malaria, too, he notes as responsible for much sickness and absence from rural schools. He also rightly points out that it is to the teaching of the elementary principles of hygiene in schools that the ultimate sanitary progress of the Island depends, and it is satisfactory to note that this question is receiving the attention of the Department of Education. Detailed inspections of schools in Kandy and Galle were also carried out during the year. His reports on the vernacular schools in Colombo discloses serious sanitary defects, both in buildings and sanitary conveniences. The inspection of girl's schools in Colombo has been carried out by Mrs. Dr. Aldons, and it is satisfactory to be able to record that, as a result of her efforts and that of the school nurse, there has been a marked improvement in the "Pediculosis" returns. Progress in the remedy of ailments and defects in school children is hampered by the lack of facilities for treatment, except in a few urban centres quite apart from the unwillingness of parents in many cases to have recourse to western medical methods. Even in Colombo, up to the present, there is no Dental Institution though it is hoped that provision will shortly be made to provide one.

In all some 11,660 children were medically examined, and defects or ailments found in 2,428 of them. Thirty-five boys' schools and sixty-eight girls' schools were inspected.

45. *Medical Work in Connection with Railway Extensions.*—Hospitals were maintained at Madurankuli on the Puttalam line, at Kantalai, Topawewa, and Oddamvali in connection with the Trincomalee-Batticaloa Railway, and in addition there were 5 dispensaries provided to meet the requirements of various sections of that line. The labour employed is partly departmental and partly labourers employed by contractors. The former are better housed and cared for and the influence of malaria is not unduly heavy amongst them.

The total number of patients treated in the railway extensions hospitals was 2,228, of whom 71 died, half of these from pneumonia; and 13,904 cases were treated at the dispensaries.

#### 46. SECTION VII.—REVENUE AND EXPENDITURE IN 1921-1922.

EXPENDITURE.		Rs.	c.	Rs.	c.
Salaries, wages, &c.	..	—		1,997,709	51
Diets	..	1,492,539	75		
Equipment and contingencies	..	299,101	7		
Medicines, &c.	..	715,918	34		
Bacteriological Institute, &c.	..	27,732	24		
Tuberculosis Institute and sanatorium and hospital.	..	85,464	76		
Transport and travelling	..	313,067	76		
Rents	..	45,495	70		
Grants	..	12,110	0		
Sanitation and epidemics	..	62,628	40		
Special equipments	..	47,762	52		
Incidental expenses	..	9,174	56		
Purchase of opium, &c.	..	297,902	34		
Compensation for loss in opium revenue	..	83,902	12		
Loss of money by theft	..	143	63		
Anchylostomiasis campaign	..	105,640	61		
Refund of security deposit of a contractor	..	1,057	12		
				3,599,640	92
<i>Head 22b.—Institute of Medical Research.</i>					
Salaries, wages, &c.	..	23,423	77		
Travelling, &c.	..	8,905	28		
Incidental expenses	..	3,416	98		
				35,746	3
Total	..	5,633,096	46		





REVENUE.		Rs.	c.
Hospital and dispensary receipts ..	..	192,552	44
Sale of drugs, &c. ..	..	10,497	16
Sale of drugs under Medical Wants Ordinance ..	..	7,094	2
Medical aid dues, maintenance, and visits ..	..	154,422	54
Sale of opium ..	..	574,006	52
Medical aid dues export duties ..	..	1,016,805	72
Total ..		1,955,378	40

47. *Strength of the Medical Department.*—The following was the strength of the Medical Department during the period : 1 Principal Civil Medical Officer ; 1 Assistant Principal Civil Medical Officer ; 1 Accountant ; 3 Inspecting Medical Officers ; 4 Medical Superintendents, at the General Hospital, Colombo, Lunatic Asylum, Leper Asylum, and the De Soysa Lying-in Home ; 9 Provincial Surgeons ; 1 Medical Officer, Anti-Tuberculosis Institute, Colombo ; 193 Medical Officers, including the Medical Superintendent, De Soysa Lying-in Home ; 2 Anæsthetists ; 1 Female Medical Practitioner ; 349 Apothecaries ; 9 Inspectors of Vaccination ; 142 Vaccinators, including 9 Female Vaccinators ; 1 Hospital Assistant, Borella Convict Hospital ; 43 Hospital Stewards ; 1 Director, Bacteriological Institute ; 1 Bacteriologist and 1 Assistant (a Medical Officer) ; 1 Malariologist ; 1 Superintendent, Civil Medical Stores ; 1 Assistant Superintendent ; 1 Sanitary Commissioner ; 1 Assistant Sanitary Commissioner ; 7 Sanitary Officers ; 1 Sanitary Engineer ; 1 Sanitary Superintendent ; 128 Sanitary Inspectors ; 34 European Matrons and Trained Nurses ; 69 European Religious Sisters ; 276 Ceylonese Matrons, Nurses, and Pupil Nurses ; 2 Pay Agents ; 1 Opium Storckeeper ; 40 Opium Clerks and Sellers.

48. I proceeded to Europe on leave on May 17, 1922, and returned to the Island on November 21 of the same year, Dr. G. Thornton, M.D., the Assistant Principal Civil Medical Officer, acted for me during my absence ; 19 other Medical Officers, including Dr. L. Nichols, Director, Bacteriological Institute, were on long leave in Europe, 13 of whom returned to the Island during the year.

49. The following is a list of Medical and Sanitary requirements that have been asked for during the past few years, but for which provision has not been made for want of funds :—

(1) *A Medical Research Institute.*—Research on many problems is required, and there is no provision for the requisite staff and buildings.

(2) *A Dental Institute.*—Provision for this is included in the Draft Estimates for 1923–24. There is no provision in Ceylon whereby the poor can receive dental treatment, and the establishment of such an Institute would also provide a means where school children requiring such treatment could be referred by the School Medical Officers.

(3) Complete plans for the rebuilding of the Medical College were drawn up and agreed to several years ago, but so far only the Anatomy Block has been provided. There is urgent need for an up-to-date Physiological Laboratory and a Pathological Laboratory and Museum. The satisfactory training of medical students is seriously handicapped for want of these.

(4) The teaching staff of the Medical College and Hospital requires augmenting if we are to meet the recently amended requirements of the General Medical Council. A whole time Professor of Physiology with at least one qualified assistant and a whole time Professor of Pathology also with at least one qualified assistant are absolutely essential (in an English medical school each Professor has 3 or 4 qualified assistants), and both a medical and a surgical registrar on the staff of the General Hospital are required, and so also the necessity for the appointment of a fifth Physician and a fifth Surgeon must be met. In the Draft Estimates for 1923–24 provision is made for a Professor of Physiology (who is to be Registrar of the Medical College also), and for a Clinical Pathologist to the hospital, who it is intended shall be assistant to the Professor of Pathology when such Professor is appointed.

(5) *Rebuilding the Non-paying Section of the General Hospital.*—Plans and estimates were approved of some years ago, but nothing has been done as yet. Here, again, the want of modern ward accommodation with clinical “side” rooms materially hampers the training of students, and the constant overcrowding shows the need for more accommodation for patients.

(6) Suitable office accommodation for the Sanitary Department is also an urgent need, and so also is provision for an increase in the medical staff of that department.

(7) As regards general sanitation a materially increased provision for improved water supplies to various towns and villages and for additional public latrines is a pressing necessity.

(8) An increase in the medical staff available for parangi work is a necessity. The Committee's recommendations on that point were deferred for want of funds. Provision is being made in the Draft Estimates for 1923–24, and it is hoped that it will be agreed to. The campaign against parangi is meeting with great success even with the limited available itinerating medical staff, and further expenditure on this work is eminently justifiable.

(9) Plans and estimates for a new Infectious Diseases Hospital for Colombo have been approved of some years ago (and the land acquired for the same), but funds for the building of it are deleted year after year from the Draft Estimates.

(10) The hospital attached to the Central Jail in Colombo is of an obsolete and unsatisfactory type, and a new one is urgently necessary.

(11) A new prison to replace the one at Mahara (11 miles from Colombo) is badly needed. The site at Mahara is very malarious, and the health of the prisoners and the staff there is materially affected.

(12) Many urgent medical additions to existing hospitals in the planting districts, and otherwise especially at Kandy, have been included for consideration in the Estimates, but have had to be deleted owing to lack of funds.

(13) The building of the male portion of the Lunatic Asylum at Angoda is a matter of urgent necessity, so that the inmates may be moved from the present overcrowded asylum, and it is hoped that the work will be proceeded with at once.

G. J. RUTHERFORD,  
Principal Civil Medical Officer and  
Inspector-General of Hospitals.

Colombo, May 24, 1923.







## APPENDIX.

## OPIUM.

SINCE the previous report there have been no amendments to, and alterations of, the laws and regulations relating to the control of opium traffic in Ceylon.

The number of opium depôts in the Island remains the same as during the previous year, namely, 54.

During the year 4,613 lb. of eating opium and 636 lb. of smoking opium have been sold to the registered consumers and vedaralas in the Island, as compared with 5,362 lb. of eating and 675 lb. of smoking opium in 1921. This shows a decrease of 788 lb. in the consumption of opium (eating and smoking) during the year. The reduction in the sale of opium is due to the deaths among consumers.

The total number of registered consumers, according to the returns furnished by the various opium depôts throughout the Island, is 9,908, as compared with 10,645 in 1921. Fifty-nine new consumers were added to the register during the year under section 11, sub-section (4), of the Ordinance No. 5 of 1910, on purely medical grounds. The number of registrations is more than that of the previous year by 19, but all the cases were recommended by responsible medical officers after careful examination. The total number of persons who use only smoking opium has decreased from 688 in 1921 to 674, approximately, in 1922. The register of vedaralas shows that their number has come down from 2,895 in 1921 to 2,812 in 1922.

Raw opium is imported to Ceylon from India, and the Ceylon Government has entered into a contract for a period of three years and three months from October 1, 1920, for the purchase of raw opium from the Indian Government at the rate of Rs. 4,000 per chest. During the year 60 chests of raw opium were imported to the Island. 7,190 lb. of eating and smoking opium were extracted from these 60 chests, which works out at an average of 2 lb. 8½ oz. of eating and 7 oz. of prepared opium per each ball. 86 lb. 11 oz. and 352 grains of hard opium have been received at the Government Opium Store during the year from the Principal Collector of Customs and the Police Magistrates in different parts of the Island. This quantity represents the opium which had been smuggled into the Island and seized by the Customs and the Police authorities.

The amount realized out of the sale of opium preparations during the year was Rs. 5,722·93.

A statement of opium sold and the amounts realized during each quarter of the year is appended. It will be noticed that the total sales for the year are less than those of the previous year, which are inserted for comparison :—

Statement of Opium sold and Amounts realized during each Quarter from January 1, 1922,  
to December 31, 1922.

During the Quarter ended	Eating Opium.			Smoking Opium.			Total realized.
	Quantity sold. Grains.	Amount realized. Rs. c.		Quantity sold. Grains.	Amount realized. Rs. c.		
March 31, 1922 ..	8,425,031	126,518 68	..	1,121,000	22,420 0	..	148,938 68
June 30, 1922 ..	8,099,456	121,637 21	..	1,109,475	22,189 50	..	143,826 71
September 30, 1922 ..	8,107,845	121,748 76	..	1,108,975	22,179 50	..	143,928 26
December 31, 1922 ..	7,662,442	115,068 87	..	1,112,200	22,244 0	..	137,312 87
Total for 1922 ..	32,294,774	484,973 52		4,451,650	89,033 0		574,006 52
Total for 1921 ..	37,535,345	564,724 86		4,723,200	94,464 0		659,188 86

Colombo, May 24, 1923.

G. J. RUTHERFORD,  
Principal Civil Medical Officer and  
Inspector-General of Hospitals.

